GS 4.108:40/pt 81-99/982 MF

code of federal regulations

Protection of Environment

40

PARTS 81 TO 99

Revised as of July 1, 1982

QA - 603 - 94239-5

code of federal regulations

Protection of Environment

40

PARTS 81 TO 99

Revised as of July 1, 1982

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Cite this Code CFR

thus: 40 CFR 81.1

Explanation

The Code of Federal Regulations is a codification of the general and permanent rules published in the Federal Register by the Executive departments and agencies of the Federal Government. The Code is divided into 50 titles which represent broad areas subject to Federal regulation. Each title is divided into chapters which usually bear the name of the issuing agency. Each chapter is further subdivided into parts covering specific regulatory areas.

ISSUE DATES

Each volume of the Code is revised at least once each calendar year and issued on a quarterly basis approximately as follows:

Title 1 through Title 16..... as of January 1
Title 17 through Title 27..... as of April 1
Title 28 through Title 41..... as of July 1
Title 42 through Title 50..... as of October 1

The appropriate revision date is printed on the cover of each volume.

LEGAL STATUS

The contents of the Federal Register are required to be judicially noticed (44 U.S.C. 1507). The Code of Federal Regulations is prima facie evidence of the text of the original documents (44 U.S.C. 1510).

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The Code of Federal Regulations is kept up to date by the individual issues of the Federal Register. These two publications must be used together to determine the latest version of any given rule.

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EFFECTIVE AND EXPIRATION DATES

Each volume of the Code contains amendments published in the Federal Register since the last revision of that volume of the Code. Source citations for the regulations are referred to by volume number and page number of the Federal Register and date of publication. Publication dates and effective dates are usually not the same and care must be exercised by the user in determining the actual effective date. In instances where the effective date is beyond the cut-off date for the Code a note has been inserted to reflect the future effective date. In those instances where a regulation published in the Federal Register states a

date certain for expiration, an appropriate note will be inserted following the text.

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The Paperwork Reduction Act of 1980 (Pub. L. 96-511) requires Federal agencies to take steps to reduce the Federal paperwork burden for individuals, small businesses and State and local governments, as well as to maximize the usefulness of information collection. One specific requirement of the Act is for Federal agencies to display an OMB control number with the information collection request.

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An index to the text of Presidential documents appears at the end of each compilation of Title 3, The President.

The Federal Register Index is issued monthly in cumulative form. This index is based on a consolidation of the "Contents" entries in the daily Federal Register.

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For a summary, legal interpretation, or other explanation of any regulation in this volume, contact the issuing agency. Inquiries concerning editing procedures and reference assistance with respect to the Code of Federal Regulations may be addressed to the Director, Office of the Federal Register, National Archives and Records Service, General Services Administration, Washington, D.C. 20408 (telephone 202-523-3517). Sales are handled exclusively by the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.

JOHN E. BYRNE,
Director,
Office of the Federal Register.

July 1, 1982.

THIS TITLE

Title 40—PROTECTION OF ENVIRONMENT is composed of nine volumes. The parts in these volumes are arranged in the following order: Parts 0–51, Part 52, Parts 53–80, Parts 81–99, Parts 100–149, Parts 150–189, Parts 190–399, Parts 400–424 and Part 425 to end. The contents of these volumes represent all current regulations codified under this title of the CFR as of July 1, 1982.

Chapter I—Environmental Protection Agency appears in all nine volumes. In addition, all regulations issued by the Council on Environmental Quality appear in the volume containing Part 425 to end.

For this volume, Linda A. Rice-Johnston was Chief Editor, assisted by Donna L. Rickett. The Code of Federal Regulations publication program is under the direction of Martha B. Girard, assisted by Robert E. Jordan.

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APPENDIX A TO PART 81—AIR QUALITY CONTROL REGIONS (AQCR'S)

AUTHORITY: Secs. 107(a) and 301(a), 81 Stat. 490, 504; Reorg. Plan 3 of 1970; 42 U.S.C. 1857c-2(a), 1857g(a), 3 CFR 1970 Comp.

SOURCE: 36 FR 22421, Nov. 25, 1971, unless otherwise noted.

Subpart A—Meaning of Terms

§ 81.1 Definitions.

As used in this part, all terms not defined herein shall have the meaning given them by the Act.

(a) "Act" means the Clean Air Act as amended (42 U.S.C. 1857-1857l, as amended by Pub. L. 91-604).

(b) "Administrator" means the Administrator of the Environmental Protection Agency or his authorized representative.

Subpart B—Designation of Air Quality Control Regions

§ 81.11 Scope.

Air quality control regions designated by the Administrator pursuant to section 107 of the Act are listed in this subpart. Regions so designated are subject to revision, and additional regions may be designated, as the Administrator determines necessary to protect the public health and welfare.

§ 81.12 National Capital Interstate Air Quality Control Region (District of Columbia, Maryland, and Virginia).

The National Capital Interstate Air Quality Control Region (District of Columbia, Maryland, and Virginia) consists of the territorial area encompassed by the boundaries of the following jurisdictions (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

DISTRICT OF COLUMBIA

In the State of Maryland: Montgomery County; Prince Georges County.

In the State of Virginia: Arlington County; Fairfax County; Loudoun County; Prince William County.

(As so delimited, the Virginia portion of the region will include the city of Alexandria, the city of Fairfax, and the city of Falls Church.)

§ 81.13 New Jersey-New York-Connecticut Interstate Air Quality Control Region.

The New Jersey-New York-Connecticut Interstate Air Quality Control Region has been revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Connecticut: Bethel Township, Bridgeport Township, Bridgewater, Brookfield Township, Danbury Township, Darien Township, Easton Township, Fairfield Township, Greenwich Township, Monroe Township, New Canaan Township, New Fairfield Township, New Milford, Newtown Township, Norwalk Township, Redding Township, Ridgefield Township, Sherman, Stamford Township, Stratford Township, Trumbull Township, Weston Township, Westport Township, Wilton Township.

In the State of New York: Bronx County, Kings County, Nassau County, New York County, Queens County, Richmond County, Rockland County, Suffolk County, Westchester County.

In the State of New Jersey: Bergen County, Essex County, Hudson County, Middlesex County, Monmouth County, Morris County, Passaic County, Somerset County, Union County.

(Secs. 110, 172, and 301 of the Clean Air Act, as amended)

[36 FR 22421, Nov. 25, 1971, as amended at 45 FR 84788, Dec. 23, 1980]

§ 81.14 Metropolitan Chicago Interstate Air Quality Control Region.

The Metropolitan Chicago Interstate Air Quality Control Region (Illinois-Indiana) is revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Illinois: Cook County, Du Page County, Grundy County, Kane County, Kankakee County, Kendall County, Lake County, McHenry County, Will County.

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In the State of Indiana: Lake County, Porter County.

§ 81.15 Metropolitan Philadelphia Interstate Air Quality Control Region (Pennsylvania-New Jersey-Delaware).

The Metropolitan Philadelphia Interstate Air Quality Control Region (Pennsylvania-New Jersey-Delaware) consists of the territorial area encompassed by the boundaries of the following jurisdictions (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Pennsylvania: Bucks County, Chester County, Delaware County, Montgomery County, Philadelphia County.

In the State of New Jersey: Burlington County, Camden County, Gloucester County, Mercer County, Salem County.

In the State of Delaware: New Castle County.

§ 81.16 Metropolitan Denver Intrastate Air Quality Control Region.

The Metropolitan Denver Intrastate Air Quality Control Region (Colorado) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Colorado: Adams County, Arapahoe County, Boulder County, Clear Creek County, Denver County, Douglas County, Gilpin County, Jefferson County.

(Sec. 301(a), 81 Stat. 490, 504; 42 U.S.C. 1857g(a) as amended by sec. 15(c)(2) of Public Law 91-604)

NOTE: For purposes of identification, the Regions are referred to by Colorado authorities as follows:

Sec.
481.172 Comanche Intrastate Air Quality Control Region: Region Three.
481.173 Grand Mesa Intrastate Air Quality Control Region: Region Seven.
481.174 Pawnee Intrastate Air Quality Control Region: Region One.
481.175 San Isabel Intrastate Air Quality Control Region: Region Four.
481.176 San Luis Intrastate Air Quality Control Region: Region Five.
481.177 Yampa Intrastate Air Quality Control Region: Region Eight.
481.16 Metropolitan Denver Intrastate Air Quality Control Region: Region Two.

§ 81.17 Metropolitan Los Angeles Air Quality Control Region.

The Metropolitan Los Angeles Air Quality Control Region consists of the following territorial area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

Ventura County—the entire county;
Orange County—the entire county;
Riverside County—that portion of Riverside County which lies west of a line described as follows: Beginning at the point where the range line common to R. 4 E. and R. 3 E. intersects with Riverside-San Diego County boundary and running north along said range line; then east along the township line common to T. 8 S. and T. 7 S. to the southeast corner of sec. 36, T. 7 S., R. 3 E.; then north along the range line common to R. 4 E. and R. 3 E.; then east along the township line common to T. 8 S. and T. 7 S.; then north along the range line common to R. 5 E. and R. 4 E.; then west along the township line common to T. 6 S. and T. 7 S. to the southwest corner of sec. 34, T. 6 S., R. 4 E.; then north along the west boundaries of secs. 34, 27, 22, 15, 10, and 3, T. 6 S., R. 4 E.; then west along the township line common to T. 5 S. and T. 6 S.; then north along the range line common to R. 4 E. and R. 3 E.; then west along the south boundaries of secs. 13, 14, 15, 16, 17, and 18, T. 5 S., R. 3 E.; then north along the range line common to R. 2 E. and R. 3 E.; then west along the township line common to T. 4 S. and T. 3 S. to the intersection with the southwest boundary of partial sec. 31, T. 3 S., R. 1 W.; then northwest along that line to the intersection with the range line common to R. 2 W. and R. 1 W.; then north to the intersection of said range line with the Riverside-San Bernardino County line;
San Bernardino County—that portion of San Bernardino County which lies west and south of a line described as follows: Beginning at the point where the San Bernardino-Riverside County boundary is intersected by the range line common to R. 3 E. and R. 2 E. and running east along said county boundary; then north along the range line common to R. 3 E. and R. 2

E.; then west along the township line common to T. 3 N. and T. 2 N. to the intersection of said township line with the San Bernardino-Los Angeles County boundary;

Los Angeles County—that portion of Los Angeles County which lies south and west of a line described as follows: Beginning at the point where the township line common to T. 3 N. and T. 2 N. intersects with the Los Angeles-San Bernardino County boundary and running west along said township line; then north along the range line common to R. 8 W. and R. 9 W.; then west along the township line common to T. 4 N. and T. 3 N.; then north along the range line common to R. 12 W. and R. 13 W. to the southeast corner of sec. 12, T. 5 N., R. 13 W.; then west along the south boundaries of secs. 12, 11, 10, 9, 8, and 7, T. 5 N., R. 13 W. to the boundary of the Angeles National Forest which is collinear with the range line common to R. 13 W. and R. 14 W.; then north and west along the Angeles National Forest boundary to the point of intersection with the township line common to T. 7 N. and T. 6 N. (point is at the northwest corner of sec. 4 in T. 6 N., R. 14 W.); then west along the township line common to T. 7 N. and T. 6 N.; then north along the range line common to R. 15 W. and R. 16 W. to the southeast corner of sec. 13, T. 7 N., R. 16 W.; then west along the south boundaries of secs. 13, 14, 15, 16, 17, and 18, T. 7 N., R. 16 W.; then north along the range line common to R. 16 W. and R. 17 W. to the north boundary of the Angeles National Forest (collinear with township line common to T. 8 N. and T. 7 N.); then west and north along the Angeles National Forest boundary to the point of intersection with the south boundary of the Rancho La Liebre Land Grant; then west and north along this land grant boundary to the point at which it intersects with the Los Angeles-Kern County boundary; then west along said county boundary to the northwest corner of Los Angeles County;

Santa Barbara County—that portion of Santa Barbara County which lies south of a line described as follows: Beginning at the point where the Jalama Creek runs into the Pacific Ocean and running east and north along Jalama Creek to a point of intersection with the west boundary of the San Julian Land Grant; then south along the San Julian Land Grant boundary to its southwest corner; then east along the south boundary of the San Julian Land Grant to the northeast corner of partial sec. 20, T. 5 N., R. 32 W.; then south and east along the boundary of the Las Cruces Land Grant to the southwest corner of partial sec. 22, T. 5 N., R. 32 W.; then northeast along the Las Cruces Land Grant boundary; then east along the north boundaries of sec. 13, T. 5 N., R. 32 W., and secs. 18, 17, 16, 15, 14, 13, T. 5 N., R. 31 W., and secs. 18, 17, 16, 15, 14, 13, of T. 5 N., R. 30 W., and secs. 18, 17, 16, 15, T. 5 N., R. 29 W.; then south along the east boundary of sec. 15, T. 5 N., R. 29 W.; then east along the north boundaries of secs. 23 and 24, T. 5 N., R. 29 W., and secs. 19, 20, 21, 22, 23, 24, T. 5 N., R. 28 W., and secs. 19 and 20, T. 5 N., R. 27 W.; then south along the east boundary of sec. 20, T. 5 N., R. 27 W.; then east along the north boundaries of secs. 28, 27, 26, 25, T. 5 N., R. 27 W., and sec. 30, T. 5 N., R. 26 W.; then south along the east boundary of sec. 30, T. 5 N., R. 26 W.; then east along the north boundaries of secs. 32, 33, 34, 35, T. 5 N., R. 26 W.; then south along the east boundary of sec. 35, T. 5 N., S. 26 W.; then east along the township line common to T. 4 N. and T. 5 N. to the intersection of said township line with the Santa Barbara-Ventura County boundary.

§ 81.18 Metropolitan St. Louis Interstate Air Quality Control Region.

The Metropolitan St. Louis Interstate Air Quality Control Region (Missouri-Illinois) is revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f) geographically located within the outermost boundaries of the area so delimited):

In the State of Illinois: Bond County, Clinton County, Madison County, Monroe County, Randolph County, St. Clair County, Washington County.

In the State of Missouri: Franklin County, Jefferson County, St. Charles County, St. Louis City, St. Louis County.

§ 81.19 Metropolitan Boston Intrastate Air Quality Control Region.

The Metropolitan Boston Intrastate Air Quality Control Region (Massachusetts) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Massachusetts: CITIES—Beverly, Boston, Brockton, Cambridge, Chelsea, Everett, Gloucester, Lynn, Malden, Marlborough, Medford, Melrose, Newton, Peabody, Quincy, Revere, Salem, Somerville, Waltham, Woburn.

TOWNSHIPS—Abington, Acton, Arlington, Ashland, Avon, Bedford, Belmont, Bolton, Boxborough, Braintree, Bridgewater, Brookline, Burlington, Canton, Cohasset, Concord, Danvers, Dedham, Dover, Duxbury, East Bridgewater, Easton, Essex, Framingham, Hamilton, Hanover, Hanson, Hingham, Holbrook, Holliston, Hopkinton, Hudson, Hull, Ipswich, Lexington, Lincoln, Lynnfield, Manchester, Marblehead, Marshfield, Maynard, Medfield, Middleton, Millis, Milton, Nahant, Natick, Needham, Norfolk, North Reading, Norwell, Norwood, Pembroke, Randolph, Reading, Rockland, Rockport, Saugus, Scituate, Sharon, Sherborn, Southborough, Stoneham, Stoughton, Stow, Sudbury, Swampscott, Topsfield, Wakefield, Walpole, Watertown, Wayland, Wellesly, Wenham, West Bridgewater, Weston, Westwood, Weymouth, Whitman, Wilmington, Winchester, Winthrop.

§ 81.20 Metropolitan Cincinnati Interstate Air Quality Control Region.

The Metropolitan Cincinnati Interstate Air Quality Control Region (Ohio-Kentucky-Indiana) is revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f) geographically located within the outermost boundaries of the area so delimited):

In the State of Kentucky: Boone County, Campbell County, Carroll County, Gallatin County, Grant County, Kenton County, Owen County, Pendleton County.

In the State of Indiana: Dearborn County, Ohio County.

In the State of Ohio: Butler County, Clermont County, Hamilton County, Warren County.

§ 81.21 San Francisco Bay Area Intrastate Air Quality Control Region.

The San Francisco Bay Area Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions (including the territorial area of all municipalities as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f) geographically located within the outermost boundaries of the area so delimited):

In the State of California: Alameda County, Contra Costa County, Marin County, Napa County; San Francisco County, San Mateo County, Santa Clara County.

Solano County—that portion of Solano County which lies south and west of a line described as follows:

Beginning at the intersection of the westerly boundary of Solano County and the ¼ section line running east and west through the center of Section 34, T. 6 N., R. 2 W., M.D.B.&M., thence east along said ¼ section line to the east boundary of Section 36, T. 6 N., R. 2 W., thence south ½ mile and east 2.0 miles, more or less, along the west and south boundary of Los Putos Rancho to the northwest corner of Section 4, T. 5 N., R. 1 W., thence east along a line common to T. 5 N. and T. 6 N. to the northeast corner of Section 3, T. 5 N., R. 1 E., thence south along section lines to the southeast corner of Section 10, T 3 N., R. 1 E., thence east along section lines to the south ¼ corner of Section 8, T. 3 N., R. 2 E., thence east to the boundary between Solano and Sacramento Counties.

Sonoma County—that portion of Sonoma County which lies south and east of a line described as follows:

Beginning at the southeasterly corner of the Rancho Estero Americano, being on the boundary line between Marin and Sonoma Counties, California; thence running northerly along the easterly boundary line of said Rancho Estero Americano to the northeasterly corner thereof, being an angle corner in the westerly boundary line of Rancho Canada de Jonive; thence running along said boundary of Rancho Canada de Jonive westerly, northerly and easterly to its intersection with the easterly line of Graton Road; thence running along the easterly and southerly line of Graton Road, northerly and easterly to its intersection with the easterly line of Sullivan Road; thence running northerly along said easterly line of Sullivan Road to the southerly line of Green Valley Road; thence running easterly along the said southerly line of Green Valley Road and easterly along the southerly line of State Highway 116, to the westerly line of Vine Hill Road; thence running along the westerly and northerly line of Vine Hill Road, northerly and easterly to its intersection with the westerly line of Laguna Road; thence running northerly along the westerly line of Laguna Road and the northerly projection thereof to the northerly line of Trenton Road; thence running westerly along the northerly line of said Trenton

Road to the easterly line of Trenton-Healdsburg Road; thence running northerly along said easterly line of Trenton-Healdsburg Road to the easterly line of Eastside Road; thence running northerly along said easterly line of Eastside Road to its intersection with the southerly line of Rancho Sotoyome; thence running easterly along said southerly line of Rancho Sotoyome to its intersection with the township line common to Townships 8 and 9 North, Mt. Diablo Base and Meridian; thence running easterly along said township line to its intersection with the boundary line between Sonoma and Napa Counties, State of California.

[36 FR 22421, Nov. 25, 1971, as amended at 46 FR 3889, Jan. 16, 1981]

§ 81.22 Greater Metropolitan Cleveland Intrastate Air Quality Control Region.

The Greater Metropolitan Cleveland Intrastate Air Quality Control Region (Ohio) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Ohio: Lorain County, Cuyahoga County, Lake County, Geauga County, Portage County, Summit County, Medina County, Stark County.

§ 81.23 Southwest Pennsylvania Intrastate Air Quality Control Region.

The Southwest Pennsylvania Intrastate Air Quality Control Region is redesignated to consist of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Pennsylvania: Allegheny County, Armstrong County, Beaver County, Butler County, Greene County, Fayette County, Indiana County, Washington County, Westmoreland County.

§ 81.24 Niagara Frontier Intrastate Air Quality Control Region.

The Niagara Frontier Intrastate Air Quality Control Region (New York) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857H(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of New York: Erie County, Niagara County.

§ 81.25 Metropolitan Kansas City Interstate Air Quality Control Region.

The Metropolitan Kansas City Interstate Air Quality Control Region (Missouri-Kansas) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f) geographically located within the outermost boundaries of the area so delimited):

In the State of Missouri: Buchanan County, Cass County, Clay County, Jackson County, Platte County, Ray County.

In the State of Kansas: Johnson County, Leavenworth County, Wyandotte County.

§ 81.26 Hartford-New Haven-Springfield Interstate Air Quality Control Region.

The Hartford-New Haven-Springfield Interstate Air Quality Control Region (Connecticut-Massachusetts) consists of the territorial area encompassed by the boundaries of the following juridictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Connecticut: CITIES—Ansonia, Bristol, Derby, Hartford, Meriden, Middletown, Milford, New Britain, New Haven, Shelton, Waterbury, West Haven.

TOWNSHIPS—Andover, Avon, Beacon Falls, Berlin, Bethany, Bethlehem, Bloomfield, Bolton, Branford, Burlington, Canton, Cheshire, Cromwell, Durham, East Granby, East Haddam, East Hampton, East Hartford, East Haven, East Windsor, Ellington, Enfield, Farmington, Glastonbury, Granby, Guilford, Haddam, Hamden, Hebron, Madison, Manchester, Marlborough, Middlebury, Middlefield, Naugatuck, Newington, North Branford, North Haven, Orange, Oxford,

Plainville, Plymouth, Portland, Prospect, Rocky Hill, Seymour, Simsbury, Somers, Southbury, Southington, South Windsor, Suffield, Thomaston, Tolland, Vernon, Wallingford, Watertown, West Hartford, Wethersfield, Windsor, Windsor Locks, Wolcott, Woodbridge, Woodbury.

In the State of Massachusetts: Franklin County.

CITIES—Chicopee, Holyoke, Northampton, Springfield, Westfield.

TOWNSHIPS—Agawam, Amherst, Belchertown, Blandford, Brimfield, Chester, Chesterfield, Cummington, Easthampton, East Longmeadow, Goshen, Granby, Granville, Hadley, Hampden, Hatfield, Holland, Huntington, Longmeadow, Ludlow, Middlefield, Monson, Montgomery, Palmer, Pelham, Plainfield, Russell, Southampton, Southwick, South Hadley, Tolland, Wales, Ware, Westhampton, West Springfield, Wilbraham, Williamsburg, Worthington.

(42 U.S.C. 1857g(a) as amended by sec. 15(c)(2) of Pub. L. 91-604)

§ 81.27 Minneapolis-St. Paul Intrastate Air Quality Control Region.

The Minneapolis-St. Paul Intrastate Air Quality Control Region (Minnesota) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Minnesota: Anoka County, Carver County, Dakota County, Hennepin County, Ramsey County, Scott County, Washington County.

§ 81.28 Metropolitan Baltimore Intrastate Air Quality Control Region.

The Metropolitan Baltimore Intrastate Air Quality Control Region (Maryland) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Maryland: Anne Arundel County, Baltimore City, Baltimore County, Carroll County, Harford County, Howard County.

§ 81.29 Metropolitan Indianapolis Intrastate Air Quality Control Region.

The Metropolitan Indianapolis Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Indiana: Boone County, Hamilton County, Hancock County, Hendricks County, Johnson County, Marion County, Morgan County, Shelby County.

§ 81.30 Southeastern Wisconsin Intrastate Air Quality Control Region.

The Metropolitan Milwaukee Intrastate Air Quality Control Region (Wisconsin) has been renamed the Southeastern Wisconsin Intrastate Air Quality Control Region and consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Wisconsin: Kenosha County, Milwaukee County, Ozaukee County, Racine County, Walworth County, Washington County, Waukesha County.

§ 81.31 Metropolitan Providence Interstate Air Quality Control Region.

The Metropolitan Providence Interstate Air Quality Control Region (Rhode Island-Massachusetts) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

The Entire State of Rhode Island.

In the State of Massachusetts: Cities—Attleboro, Fall River, Acushnet, Barnstable, Bellingham, Berkley, Bourne, Brewster, Carver, Chatham, Chilmark, Dartmouth,

Dennis, Dighton, Eastham, Edgartown, Fairhaven, Falmouth, Foxborough, Franklin, Freetown, Gay Head, Gosnold, Halifax, Harwich, Kingston, Lakeville, Mansfield, Marion, Mashpee, New Bedford, Taunton.

Townships—Middleborough, Milford, Nantucket, North Attleborough, Mattapoisett, Medway, Norton, Oak Bluffs, Orleans, Plainville, Plymouth, Plympton, Provincetown, Raynham, Rehoboth, Rochester, Sandwich, Seekonk, Somerset, Swansea, Tisbury, Truro, Wareham, Wellfleet, Westport, West Tisbury, Wrentham, Yarmouth.

§ 81.32 Puget Sound Intrastate Air Quality Control Region.

The Puget Sound Intrastate Air Quality Control Region (Washington) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Washington: King County, Snohomish County, Pierce County, Kitsap County.

§ 81.33 Steubenville-Weirton-Wheeling Interstate Air Quality Control Region.

The Steubenville-Weirton-Wheeling Interstate Air Quality Control Region (Ohio-West Virginia) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Ohio: Belmont County, Columbiana County, Jefferson County, Monroe County.

In the State of West Virginia: Brooke County, Hancock County, Marshall County, Ohio County.

§ 81.34 Metropolitan Dayton Intrastate Air Quality Control Region.

The Metropolitan Dayton Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Ohio: Clark County, Darke County, Greene County, Miami County, Montgomery County, Preble County.

§ 81.35 Louisville Interstate Air Quality Control Region.

The Louisville Interstate Air Quality Control Region (Kentucky-Indiana) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Kentucky: Jefferson County.

In the State of Indiana: Floyd County, Clark County.

§ 81.36 Maricopa Intrastate Air Quality Control Region.

The Phoenix-Tucson Intrastate Air Quality Control Region has been renamed the Maricopa Intrastate Air Quality Control Region (Arizona) and has been revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Arizona: Maricopa County.

(Secs. 107, 110, and 301(a) of the Clean Air Act, as amended(42 U.S.C. 7407, 7410, 7601(a)))

[45 FR 67347, Oct. 10, 1980]

§ 81.37 Metropolitan Detroit-Port Huron Intrastate Air Quality Control Region.

The Metropolitan Detroit-Port Huron Intrastate Air Quality Control Region (Michigan) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean

Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Michigan: Macomb County, St. Clair County, Oakland County, Wayne County.

§ 81.38 Metropolitan Houston-Galveston Intrastate Air Quality Control Region.

The Metropolitan Houston-Galveston Intrastate Air Quality Control Region (Texas) has been revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Texas: Austin County, Brazoria County, Chambers County, Colorado County, Fort Bend County, Galveston County, Harris County, Liberty County, Matagorda County, Montgomery County, Walker County, Waller County, Wharton County.

§ 81.39 Metropolitan Dallas-Fort Worth Intrastate Air Quality Control Region.

The Metropolitan Dallas-Fort Worth Intrastate Air Quality Control Region (Texas) has been revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Texas: Collin County, Cooke County, Dallas County, Denton County, Ellis County, Erath County, Fannin County, Grayson County, Hood County, Hunt County, Johnson County, Kaufman County, Navarro County, Palo Pinto County, Parker County, Rockwall County, Somervell County, Tarrant County, Wise County.

§ 81.40 Metropolitan San Antonio Intrastate Air Quality Control Region.

The Metropolitan San Antonio Intrastate Air Quality Control Region (Texas) has been revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Texas: Atascosa County, Bandera County, Bexar County, Comal County, Dimmit County, Edwards County, Frio County, Gillespie County, Gonzales County, Guadalupe County, Karnes County, Kendall County, Kerr County, Kimble County, Kinney County, La Salle County, Mason County, Maverick County, Medina County, Real County, Uvalde County, Val Verde County, Wilson County, Zavala County.

§ 81.41 Metropolitan Birmingham Intrastate Air Quality Control Region.

The Metropolitan Birmingham Intrastate Air Quality Control Region (Alabama) has been revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Alabama: Bibb County, Blount County, Chilton County, Fayette County, Greene County, Hale County, Jefferson County, Lamar County, Pickens County, St. Clair County, Shelby County, Sumter County, Tuscaloosa County, Walker County.

§ 81.42 Chattanooga Interstate Air Quality Control Region.

The Chattanooga Interstate Air Quality Control Region (Georgia-Tennessee) has been revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Georgia: Bartow County, Catoosa County, Chattooga County, Cherokee County, Dade County, Fannin County,

Floyd County, Gilmer County, Gordon County, Haralson County, Murray County, Paulding County, Pickens County, Polk County, Walker County, Whitfield County.

In the State of Tennessee: Hamilton County.

§ 81.43 Metropolitan Toledo Interstate Air Quality Control Region.

The Metropolitan Toledo Interstate Air Quality Control Region (Ohio-Michigan) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Ohio: Lucas County, Wood County.

In the State of Michigan: Monroe County.

§ 81.44 Metropolitan Memphis Interstate Air Quality Control Region.

The Metropolitan Memphis Interstate Air Quality Control Region (Arkansas-Mississippi-Tennessee) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in sec. 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Arkansas: Crittenden County.

In the State of Mississippi: De Soto County.

In the State of Tennessee: Shelby County.

§ 81.45 Metropolitan Atlanta Intrastate Air Quality Control Region.

The Metropolitan Atlanta Intrastate Air Quality Control Region (Georgia) has been revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Georgia: Butts County, Carroll County, Clayton County, Cobb County, Coweta County, De Kalb County, Douglas County, Fayette County, Fulton County, Gwinnett County, Heard County, Henry County, Lamar County, Meriwether County, Pike County, Rockdale County, Spalding County, Troup County, Upson County.

§ 81.46 U.S. Virgin Islands Air Quality Control Region.

The U.S. Virgin Islands Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

The entire U.S. Virgin Islands.

§ 81.47 Central Oklahoma Intrastate Air Quality Control Region.

The Metropolitan Oklahoma Intrastate Air Quality Control Region has been renamed the Central Oklahoma Intrastate Air Quality Control Region and consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Oklahoma: Canadian County, Cleveland County, Grady County, Lincoln County, Logan County, Kingfisher County, McClain County, Oklahoma County, Pottawatomie County.

§ 81.48 Champlain Valley Interstate Air Quality Control Region.

The Champlain Valley Interstate Air Quality Control Region (Vermont-New York) has been revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Vermont: Addison County, Chittenden County, Franklin County, Grand Isle County, Rutland County.

In the State of New York: Clinton County, Essex County, Franklin County, Hamilton County, St. Lawrence County, Warren County, Washington County.

§ 81.49 Southeast Florida Intrastate Air Quality Control Region.

The Southeast Florida Intrastate Air Quality Control Region is redesignated to consist of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Florida: Broward County, Dade County, Indian River County, Martin County, Monroe County, Okeechobee County, Palm Beach County, St. Lucie County.

§ 81.50 Metropolitan Omaha-Council Bluffs Interstate Air Quality Control Region.

The Metropolitan Omaha-Council Bluffs Interstate Air Quality Control Region (Nebraska-Iowa) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Nebraska: Douglas County, Sarpy County.

In the State of Iowa: Pottawattamie County.

§ 81.51 Portland Interstate Air Quality Control Region.

The Portland Interstate Air Quality Control Region (Oregon-Washington) has been revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Oregon: Benton County, Clackamas County, Columbia County, Lane County, Linn County, Marion County, Multnomah County, Polk County, Washington County, Yamhill County.

In the State of Washington: Clark County, Cowlitz County, Lewis County, Skamania County, Wahkiakum County.

NOTE: For purposes of identification, the Portland Interstate Air Quality Control Region (Oregon-Washington) will be referred to by Washington authorities as the Portland (Oregon)-Southwest Washington Interstate Air Quality Control Region.

§ 81.52 Wasatch Front Intrastate Air Quality Control Region.

The Wasatch Front Intrastate Air Quality Control Region (Utah) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Utah: Davis County, Salt Lake County, Tooele County, Utah County, Weber County.

§ 81.53 Southern Louisiana-Southeast Texas Interstate Air Quality Control Region.

The Southern Louisiana-Southwest Texas Interstate Air Quality Control Region has been revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857(h)(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Louisiana: Acadia Parish, Allen Parish, Ascension Parish, Assumption Parish, Avoyelles Parish, Beauregard Parish, Calcasieu Parish, Cameron Parish, East Baton Rouge Parish, East Feliciana Parish, Evangeline Parish, Grant Parish, Iberia Parish, Iberville Parish, Jefferson Parish, Jefferson Davis Parish, Lafayette Parish, Lafourche Parish, Livingston Parish, Orleans Parish, Plaquemines Parish,

Pointe Coupee Parish, Rapides Parish, St. Bernard Parish, St. Charles Parish, St. Helena Parish, St. James Parish, St. John the Baptist Parish, St. Landry Parish, St. Martin Parish, St. Mary Parish, St. Tammany Parish, Tangipahoa Parish, Terrebonne Parish, Vermilion Parish, Vernon Parish, Washington Parish, West Baton Rouge Parish, West Feliciana Parish.

In the State of Texas: Angelina County, Hardin County, Houston County, Jasper County, Jefferson County, Nacogdoches County, Newton County, Orange County, Polk County, Sabine County, San Augustine County, San Jacinto County, Shelby County, Trinity County, Tyler County.

§ 81.54 Cook Inlet Intrastate Air Quality Control Region.

The Cook Inlet Intrastate Air Quality Control Region (Alaska) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Alaska: Greater Anchorage Area Borough, Kenai Peninsula Borough, Matanuska-Susitna Borough,

§ 81.55 Northeast Pennsylvania-Upper Delaware Valley Interstate Air Quality Control Region.

The Northeast Pennsylvania-Upper Delaware Valley Interstate Air Quality Control Region (Pennsylvania-New Jersey) is redesignated to consist of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Pennsylvania: Berks County, Bradford County, Carbon County, Lackawanna County, Lehigh County, Luzerne County, Monroe County, Northampton County, Pike County, Schuylkill County, Sullivan County, Susquehanna County, Tioga County, Wayne County, Wyoming County.

In the State of New Jersey: Hunterdon County, Sussex County, Warren County.

§ 81.57 Eastern Tennessee-Southwestern Virginia Interstate Air Quality Control Region.

The Bristol (Virginia)-Johnson City (Tennessee) Interstate Air Quality Control Region has been renamed the Eastern Tennessee-Southwestern Virginia Interstate Air Quality Control Region and revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Tennessee: Anderson County, Blount County, Bradley County, Campbell County, Carter County, Claiborne County, Cocke County, Grainger County, Greene County, Hamblen County, Hancock County, Hawkins County, Jefferson County, Johnson County, Knox County, Loudon County, McMinn County, Meigs County, Monroe County, Polk County, Rhea County, Roane County, Sevier County, Sullivan County, Unicoi County, Union County, Washington County.

In the State of Virginia: Bland County, Bristol City, Buchanan County, Carroll County, Dickenson County, Galax City, Grayson County, Lee County, Norton City, Russell County, Scott County, Smyth County, Tazewell County, Washington County, Wise County, Wythe County.

§ 81.58 Columbus (Georgia)-Phenix City (Alabama) Interstate Air Quality Control Region.

The Columbus (Georgia)-Phenix City (Alabama) Interstate Air Quality Control Region has been revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Alabama: Autauga County, Bullock County, Butler County, Crenshaw County, Elmore County, Lee County, Lowndes County, Macon County, Montgomery County, Pike County, Russell County.

In the State of Georgia: Chattahoochee County, Dooly County, Harris County,

Marion County, Muscogee County, Quitman County, Schley County, Stewart County, Sumter County, Talbot County, Taylor County, Webster County.

§ 81.59 Cumberland-Keyser Interstate Air Quality Control Region.

The Cumberland-Keyser Interstate Air Quality Control Region (Maryland-West Virginia) has been revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Maryland: Allegany County, Garrett County, Washington County.

In the State of West Virginia: In Grant County: Union Magisterial District.
In Mineral County: Elk Magisterial District, New Creek Magisterial District, Piedmont Magisterial District.

§ 81.60 Duluth (Minnesota)-Superior (Wisconsin) Interstate Air Quality Control Region.

The Duluth (Minnesota)-Superior (Wisconsin) Interstate Air Quality Control Region has been revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Minnesota: Aitkin County, Carlton County, Cook County, Itasca County, Koochiching County, Lake County, St. Louis County.

In the State of Wisconsin: Ashland County, Bayfield County, Burnett County, Douglas County, Iron County, Price County, Rusk County, Sawyer County, Taylor County, Washburn County.

§ 81.61 Evansville (Indiana)-Owensboro-Henderson (Kentucky) Interstate Air Quality Control Region.

The Evansville (Indiana)-Owensboro-Henderson (Kentucky) Interstate Air Quality Control Region is revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Kentucky: Daviess County, Hancock County, Henderson County, McLean County, Ohio County, Union County, Webster County.

In the State of Indiana: Dubois County, Gibson County, Perry County, Pike County, Posey County, Spencer County, Vanderburgh County, Warrick County.

§ 81.62 Northeast Mississippi Intrastate Air Quality Control Region.

The Alabama-Mississippi-Tennessee Interstate Air Quality Control Region has been renamed the Northeast Mississippi Intrastate Air Quality Control Region and revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Mississippi: Alcorn County, Attala County, Benton County, Calhoun County, Carroll County, Chickasaw County, Choctaw County, Clay County, Grenada County, Holmes County, Itawamba County, Kemper County, Lafayette County, Leake County, Lee County, Lowndes County, Marshall County, Monroe County, Montgomery County, Neshoba County, Noxubee County, Oktibbeha County, Panola County, Pontotoc County, Prentiss County, Tate County, Tippah County, Tishomingo County, Union County, Webster County, Winston County, Yalobusha County.

§ 81.63 Metropolitan Fort Smith Interstate Air Quality Control Region.

The Metropolitan Fort Smith Interstate Air Quality Control Region (Arkansas-Oklahoma) has been revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located

within the outermost boundaries of the area so delimited):

In the State of Arkansas: Benton County, Crawford County, Sebastian County, Washington County.

In the State of Oklahoma: Adair County, Cherokee County, Le Flore County, Sequoyah County.

§ 81.64 Huntington (West Virginia)-Ashland (Kentucky)-Portsmouth-Ironton (Ohio) Interstate Air Quality Control Region.

The Huntington (West Virginia)-Ashland (Kentucky)-Portsmouth-Ironton (Ohio) Interstate Air Quality Control Region is revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions of described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Kentucky: Bath County, Boyd County, Bracken County, Carter County, Elliott County, Fleming County, Greenup County, Lawrence County, Lewis County, Mason County, Menifee County, Montgomery County, Morgan County, Robertson County, Rowan County.

In the State of Ohio: Adams County, Brown County, Gallia County, Lawrence County, Scioto County.

In the State of West Virginia: Cabell County, Mason County, Wayne County.

§ 81.65 Joplin (Missouri)-Northeast Oklahoma Interstate Air Quality Control Region.

The Joplin (Missouri)-Northeast Oklahoma Interstate Air Quality Control Region, designated on December 8, 1970, and consisting of the counties of Barton, Jasper, McDonald, and Newton in the State of Missouri and Craig, Delaware, and Ottawa in the State of Oklahoma, is revoked effective upon publication.

§ 81.66 Southeast Minnesota-La Crosse (Wisconsin) Interstate Air Quality Control Region.

The Southeast Minnesota-La Crosse (Wisconsin) Interstate Air Quality Control Region has been revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857m(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Minnesota: Blue Earth County, Brown County, Dodge County, Fairbault County, Fillmore County, Freeborn County, Goodhue County, Houston County, Le Sueur County, Martin County, Mower County, Nicollet County, Olmsted County, Rice County, Sibley County, Steele County, Wabasha County, Waseca County, Watonwan County, Winona County.

In the State of Wisconsin: Barron County, Buffalo County, Chippewa County, Clark County, Crawford County, Dunn County, Eau Claire County, Jackson County, La Crosse County, Monroe County, Pepin County, Pierce County, Polk County, St. Croix County, Trempealeau County, Vernon County.

§ 81.67 Lake Michigan Intrastate Air Quality Control Region.

The Menominee-Escanaba (Michigan)-Marinette (Wisconsin) Interstate Air Quality Control Region has been renamed the Lake Michigan Intrastate Air Quality Control Region (Wisconsin) and revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Wisconsin: Brown County, Calumet County, Door County, Fond du Lac County, Green Lake County, Kewaunee County, Manitowoc County, Marinette County, Marquette County, Menominee County, Oconto County, Outagamie County, Shawano County, Sheboygan County, Waupaca County, Waushara County, Winnebago County.

§ 81.68 Mobile (Alabama)-Pensacola-Panama City (Florida)-Southern Mississippi Interstate Air Quality Control Region.

The Mobile (Alabama)-Pensacola-Panama City (Florida)-Gulfport (Mississippi) Interstate Air Quality Control Region has been renamed the

Mobile (Alabama)-Pensacola-Panama City (Florida)-Southern Mississippi Interstate Air Quality Control Region and revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Alabama: Baldwin County, Escambia County, Mobile County.

In the State of Florida: Bay County, Calhoun County, Escambia County, Gulf County, Holmes County, Jackson County, Okaloosa County, Santa Rosa County, Walton County, Washington County.

In the State of Mississippi: Adams County, Amite County, Clairborne County, Clarke County, Copiah County, Covington County, Forrest County, Franklin County, George County, Greene County, Hancock County, Harrison County, Hinds County, Jackson County, Jasper County, Jefferson County, Jefferson Davis County, Jones County, Lamar County, Lauderdale County, Lawrence County, Lincoln County, Madison County, Marion County, Newton County, Pearl River County, Perry County, Pike County, Rankin County, Scott County, Simpson County, Smith County, Stone County, Walthall County, Warren County, Wayne County, Wilkinson County.

§ 81.69 Paducah (Kentucky)-Cairo (Illinois) Interstate Air Quality Control Region.

The Paducah (Kentucky)-Cairo (Illinois) Interstate Air Quality Control Region is revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Illinois: Alexander County, Johnson County, Massac County, Pope County, Pulaski County, Union County.

In the State of Kentucky: Ballard County, Caldwell County, Calloway County, Carlisle County, Christian County, Crittenden County, Fulton County, Graves County, Hickman County, Hopkins County, Livingston County, Lyon County, Marshall County, McCracken County, Muhlenberg County, Todd County, Trigg County.

§ 81.70 Parkersburg (West Virginia)-Marietta (Ohio) Interstate Air Quality Control Region.

The Parkersburg (West Virginia)-Marietta (Ohio) Interstate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f) geographically located within the outermost boundaries of the area so delimited):

In the State of West Virginia: Jackson County, Pleasants County, Tyler County, Wetzel County, Wood County.

In the State of Ohio: Athens County, Meigs County, Morgan County, Washington County.

§ 81.71 Rockford (Illinois)-Janesville-Beloit (Wisconsin) Interstate Air Quality Control Region.

The Rockford (Illinois)-Janesville-Beloit (Wisconsin) Interstate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Illinois: Boone County, De Kalb County, Ogle County, Stephenson County, Winnebago County.

In the State of Wisconsin: Rock County.

§ 81.72 Tennessee River Valley (Alabama)-Cumberland Mountains (Tennessee) Interstate Air Quality Control Region.

The Scottsboro (Alabama)-Jasper (Tennessee) Interstate Air Quality Control Region has been renamed the Tennessee River Valley (Alabama)-Cumberland Mountains (Tennessee) Interstate Air Quality Control Region and revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42

U.S.C. 1875h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Alabama: Colbert County, Cullman County, De Kalb County, Franklin County, Jackson County, Lauderdale County, Lawrence County, Limestone County, Madison County, Marion County, Marshall County, Morgan County, Winston County.

In the State of Tennessee: Bledsoe County, Coffee County, Cumberland County, Fentress County, Franklin County, Grundy County, Marion County, Morgan County, Overton County, Pickett County, Putnam County, Scott County, Sequatchie County, Warren County, White County, Van Buren County.

§ 81.73 South Bend-Elkhart (Indiana)-Benton Harbor (Michigan) Interstate Air Quality Control Region.

The South Bend-Elkhart (Indiana)-Benton Harbor (Michigan) Interstate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Indiana: Elkhart County, Kosciusko County, La Porte County, Marshall County, St. Joseph County.

In the State of Michigan: Berrien County, Cass County, Van Buren County.

§ 81.74 Northwest Pennsylvania-Youngstown Interstate Air Quality Control Region.

The Northwest Pennsylvania-Youngstown Interstate Air Quality Control Region (Pennsylvania-Ohio) is redesignated to consist of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Ohio: Ashtabula County, Mahoning County, Trumbull County.

In the State of Pennsylvania: Cameron County, Clarion County, Clearfield County, Crawford County, Elk County, Erie County, Forest County, Jefferson County, Lawrence County, McKean County, Mercer County, Potter County, Venango County, Warren County.

§ 81.75 Metropolitan Charlotte Interstate Air Quality Control Region.

The Metropolitan Charlotte Interstate Air Quality Control Region (North Carolina-South Carolina) has been revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of North Carolina: Cabarrus County, Gaston County, Iredell County, Lincoln County, Mecklenburg County, Rowan County, Stanly County, Union County.

In the State of South Carolina: Chester County, Lancaster County, Union County, York County.

§ 81.76 State of Hawaii Air Quality Control Region.

The State of Hawaii Air Quality Control Region consists of the territorial area encompassed by the outermost boundaries of the State of Hawaii (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited).

§ 81.77 Puerto Rico Air Quality Control Region.

The Puerto Rico Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

The entire Commonwealth of Puerto Rico: Puerto Rico and surrounding islands, Vieques and surrounding islands, Culebra and surrounding islands.

§ 81.78 Metropolitan Portland Intrastate Air Quality Control Region.

The Metropolitan Portland Intrastate Air Quality Control Region (Maine) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Maine: COUNTIES—Cumberland, Sagadahoc, York.
TOWNS—Brownfield, Denmark, Fryeburg, Hiram, Porter.

§ 81.79 Northeastern Oklahoma Intrastate Air Quality Control Region.

The Metropolitan Tulsa Intrastate Air Quality Control Region has been renamed the Northeastern Oklahoma Intrastate Air Quality Control Region and revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Oklahoma: Craig County, Creek County, Delaware County, Mayes County, Muskogee County, Nowata County, Okmulgee County, Osage County, Ottawa County, Pawnee County, Rogers County, Tulsa County, Wagoner County, Washington County.

§ 81.80 Las Vegas Intrastate Air Quality Control Region.

The Las Vegas Intrastate Air Quality Control Region (Nevada) has been revised to consist of the territorial area encompassed by the boundaries of the following jurisdiction or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 7602(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Nevada: Clark County.

(Secs. 107, 110 and 301(a) of the Clean Air Act, as amended (42 U.S.C. 7407, 7410 and 7601(a)))

[45 FR 7545, Feb. 4, 1980]

§ 81.81 Merrimack Valley-Southern New Hampshire Interstate Air Quality Control Region.

The Merrimack Valley Southern New Hampshire Interstate Air Quality Control Region (Massachusetts-New Hampshire) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Massachusetts: In Essex County, the towns of—Andover, Amesbury, Boxford, Georgetown, Groveland, Haverhill, Lawrence, Merrimac, Methuen, Newbury, Newburyport, North Andover, Rowley, Salisbury, West Newbury.

In Middlesex County, the towns of—Ayer, Billerica, Carlisle, Chelmsford, Dracut, Dunstable, Groton, Littleton, Lowell, Pepperell, Tewksbury, Tyngsborough, Westford.

In the State of New Hampshire: The counties of—Belknap, Cheshire, Hillsborough, Merrimack, Rockingham, Strafford, Sullivan.

§ 81.82 El Paso-Las Cruces-Alamogordo Interstate Air Quality Control Region.

The El Paso-Las Cruces-Alamogordo Interstate Air Quality Control Region (New Mexico-Texas) is revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Texas: Brewster County, Culberson County, El Paso County, Hudspeth County, Jeff Davis County, Presidio County.

In the State of New Mexico: Dona Ana County, Lincoln County, Otero County, Sierra County.

§ 81.83 Albuquerque-Mid Rio Grande Intrastate Air Quality Control Region.

The Albuquerque-Mid Rio Grande Intrastate Air Quality Control Region (New Mexico) is revised to consist of the territorial area encompassed by

the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of New Mexico: Bernalillo County.

Those portions of Sandoval County lying east of the Continental Divide:

Those portions of Valencia County lying east of a line described as follows: Starting at the point at which the south boundary of Bernalillo County intersects with the section line between secs. 1 and 2 T. 7 N., R. 2 W.; thence south to the southern boundary of the Laguna Indian Reservation between secs. 35 and 36 T. 7 N., R. 2 W.; then southerly on section lines to the Socorro-Valencia County line at secs. 11, 12, 13, and 14, T. 5 N., R. 2 W.

§ 81.84 Metropolitan Fargo-Moorhead Interstate Air Quality Control Region.

The Metropolitan Fargo-Moorhead Interstate Air Quality Control Region (North Dakota-Minnesota) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of North Dakota: Cass County.

In the State of Minnesota: Clay County.

§ 81.85 Metropolitan Sioux Falls Interstate Air Quality Control Region.

The Metropolitan Sioux Falls Interstate Air Quality Control Region (Iowa-South Dakota) has been revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Iowa: Lyon County.

In the State of South Dakota: Lincoln County, McCook County, Minnehaha County, Turner County.

NOTE: For purposes of identification, this Region is referred to by Minnesota authorities as follows:

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481.60 Duluth (Minnesota)-Superior (Wisconsin) Interstate Air Quality Control Region: Northeast Minnesota Region.

For purposes of identification, these Regions are referred to by Wisconsin authorities as follows:

481.60 Duluth (Minnesota)-Superior (Wisconsin) Interstate Air Quality Control Region: Northwestern Wisconsin Region.

481.66 Southeast Minnesota-La Crosse (Wisconsin) Interstate Air Quality Control Region: West Central Wisconsin Region.

§ 81.86 Metropolitan Sioux City Interstate Air Quality Control Region.

The Metropolitan Sioux City Interstate Air Quality Control Region (Iowa-Nebraska-South Dakota) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42, U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Iowa: Plymouth County, Sioux County, Woodbury County.

In the State of Nebraska: Dakota County.

In the State of South Dakota: Union County.

§ 81.87 Metropolitan Boise Intrastate Air Quality Control Region.

The Metropolitan Boise Intrastate Air Quality Control Region (Idaho) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Idaho: Ada County, Canyon County.

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§ 81.88 Billings Intrastate Air Quality Control Region.

The Metropolitan Billings Intrastate Air Quality Control Region (Montana) has been renamed the Billings Intrastate Air Quality Control Region and consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Montana: Big Horn County, Carbon County, Fergus County, Golden Valley County, Judith Basin County, Musselshell County, Petroleum County, Stillwater County, Sweet Grass County, Wheatland County, Yellowstone County.

(Sec. 301(a), 81 Stat. 490, 504; 42 U.S.C. 1857g(a) as amended by sec. 15(c)(2) of Pub. L. 91-604)

NOTE: For purposes of identification, the Regions are referred to by Montana authorities as follows:

Sec.
481.168 Great Falls Intrastate Air Quality Control Region: Region II.
481.169 Helena Intrastate Air Quality Control Region: Region IV.
481.170 Miles City Intrastate Air Quality Control Region: Region III.
481.171 Missoula Intrastate Air Quality Control Region: Region I.
481.88 Billings Intrastate Air Quality Control Region: Region V.

§ 81.89 Metropolitan Cheyenne Intrastate Air Quality Control Region.

The Metropolitan Cheyenne Intrastate Air Quality Control Region (Wyoming) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Wyoming: Albany County, Goshen County, Laramie County, Platte County.

§ 81.90 Androscoggin Valley Interstate Air Quality Control Region.

The Androscoggin Valley Interstate Air Quality Control Region (Maine-New Hampshire) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the areas so delimited):

In the State of Maine: Androscoggin County, Kennebec County, Knox County, Lincoln County, Waldo County.

In the County of Franklin: Avon Town, Carthage Town, Chesterville Town, Farmington Town, Freeman Township, Industry Town, Jay Town, New Sharron Town, New Vineyard Town, Perkins Township, Phillips Town, Salem Township, Strong Town, Temple Town, Township No. 6, Washington Township, Weld Town, Wilton Town.

In the County of Oxford: Albany Township, Andover Town , Andover North Surplus, Andover West Surplus, Batchelders Grant, Bethel Town, Buckfield Town, Byron Town, Canton Town, Dixfield Town, Gilead Town, Grafton Township, Greenwood Town, Hanover Town, Hartford Town, Hebron Town, Lovell Town, Mason Township, Mexico Town, Milton Township, Newry Town, Norway Town, Oxford Town, Paris Town, Peru Town, Riley Township, Roxbury Town, Rumford Town, Stoneham Town, Stow Town, Sumner Town, Sweden Town, Waterford Town, West Paris Town, Woodstock Town.

Somerset County—That portion of Somerset County which lies south and east of a line described as follows: Beginning at the point where the Somerset-Franklin County boundary is intersected by a line common to the northern boundary of New Portland Township and running northeast along the northern boundaries of New Portland, Embden, Solon, and Athens Townships to the intersection of said line with the Somerset-Piscataquis County boundary, which is also common to the northeast corner of Athens Township.

In the State of New Hampshire: Cass County.

§ 81.91 Jacksonville (Florida)-Brunswick (Georgia) Interstate Air Quality Control Region.

The Jacksonville (Florida)-Brunswick (Georgia) Interstate Air Quality Control Region has been revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Florida: Alachua County, Baker County, Bradford County, Clay County, Columbia County, Dixie County, Duval County, Flagler County, Franklin County, Gadsden County, Gilchrist County, Hamilton County, Jefferson County, Lafayette County, Leon County, Liberty County, Madison County, Marion County, Nassau County, Putnam County, St. Johns County, Suwannee County, Taylor County, Union County, Wakulla County.

In the State of Georgia: Appling County, Atkinson County, Bacon County, Brantley County, Camden County, Charlton County, Clinch County, Coffee County, Glynn County, Long County, McIntosh County, Pierce County, Ware County, Wayne County.

§ 81.92 Monroe (Louisiana)—El Dorado (Arkansas) Interstate Air Quality Control Region.

The Monroe (Louisiana)—El Dorado (Arkansas) Interstate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Louisiana: Caldwell Parish, Catahoula Parish, Concordia Parish, East Carroll Parish, Franklin Parish, La Salle Parish, Madison Parish, Morehouse Parish, Ouachita Parish, Richland Parish, Tensas Parish, Union Parish, West Carroll Parish.

In the State of Arkansas: Ashley County, Bradley County, Calhoun County, Nevada County, Ouachita County, Union County.

§ 81.93 Hampton Roads Intrastate Air Quality Control Region.

The Metropolitan Norfolk Intrastate Air Quality Control Region (Virginia) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Virginia:

COUNTIES—Isle of Wight, James City, Nansemond, Southampton, York.

CITIES—Chesapeake, Franklin, Hampton, Newport News, Norfolk, Portsmouth, Suffolk, Virginia Beach, Williamsburg.

§ 81.94 Shreveport-Texarkana-Tyler Interstate Air Quality Control Region.

The Shreveport-Texarkana-Tyler Interstate Air Quality Control Region (Arkansas-Louisiana-Oklahoma-Texas) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Arkansas: Columbia County, Hempstead County, Howard County, Lafayette County, Little River County, Miller County, Sevier County.

In the State of Louisiana: Bienville Parish, Bossier Parish, Caddo Parish, Claiborne Parish, De Soto Parish, Jackson Parish, Lincoln Parish, Natchitoches Parish, Red River Parish, Sabine Parish, Webster Parish, Winn Parish.

In the State of Oklahoma: McCurtain County.

In the State of Texas: Anderson County, Bowie County, Camp County, Cass County, Cherokee County, Delta County, Franklin County, Gregg County, Harrison County, Henderson County, Hopkins County, Lamar County, Marion County, Morris County, Panola County, Rains County, Red River County, Rusk County, Smith County, Titus County, Upshur County, Van Zandt County, Wood County.

§ 81.95 Central Florida Intrastate Air Quality Control Region.

The Central Florida Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Florida: Brevard County, Lake County, Orange County, Osceola County, Seminole County, Volusia County.

§ 81.96 West Central Florida Intrastate Air Quality Control Region.

The West Central Florida Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Florida: Citrus County, Hardee County, Hernando County, Hillsborough County, Levy County, Manatee County, Pasco County, Pinellas County, Polk County, Sumter County.

§ 81.97 Southwest Florida Intrastate Air Quality Control Region.

The Southwest Florida Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Florida: Charlotte County, Collier County, De Soto County, Glades County, Hendry County, Highlands County, Lee County, Sarasota County.

§ 81.98 Burlington-Keokuk Interstate Air Quality Control Region.

The Burlington-Keokuk Interstate Air Quality Control Region (Illinois-Iowa) is revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Illinois: Fulton County, Hancock County, Henderson County, Knox County, McDonough County, Mason County, Peoria County, Tazewell County, Warren County, Woodford County.

In the State of Iowa: Des Moines County, Lee County.

NOTE: For purposes of identification, the regions are referred to by Illinois authorities as follows:

Sec.
481.14 Metropolitan Chicago Interstate Air Quality Control Region: Region III.
481.262 North Central Illinois Intrastate Air Quality Control Region: Region V.
481.98 Burlington-Keokuk Interstate Air Quality Control Region: Region VI.
481.263 East Central Illinois Intrastate Air Quality Control Region: Region VII.
481.264 West Central Illinois Intrastate Air Quality Control Region: Region VIII.
481.18 Metropolitan St. Louis Interstate Air Quality Control Region: Region IX.
481.265 Southeast Illinois Intrastate Air Quality Control Region: Region X.
481.69 Paducah-Cairo Interstate Air Quality Control Region: Region XI.

§ 81.99 New Mexico Southern Border Intrastate Air Quality Control Region.

The Arizona-New Mexico Southern Border Interstate Air Quality Control Region has been renamed the New Mexico Southern Border Intrastate Air Quality Control Region and has been revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of New Mexico: Grant County, Hidalgo County, Luna County.

(Secs. 107, 110, and 301(a) of the Clean Air Act, as amended(42 U.S.C. 7407, 7410, 7601(a)))

[45 FR 67347, Oct. 10, 1980]

§ 81.100 Eastern Washington-Northern Idaho Interstate Air Quality Control Region.

The Eastern Washington-Northern Idaho Interstate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Idaho: Benewah County, Kootenai County, Latah County, Nez Perce County, Shoshone County.

In the State of Washington: Adams County, Asotin County, Columbia County, Garfield County, Grant County, Lincoln County, Spokane County, Whitman County.

§ 81.101 Metropolitan Dubuque Interstate Air Quality Control Region.

The Metropolitan Dubuque Interstate Air Quality Control Region (Illinois-Iowa-Wisconsin) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Illinois: Jo Daviess County.

In the State of Iowa: Clayton County, Dubuque County, Jackson County.

In the State of Wisconsin: Grant County.

§ 81.102 Metropolitan Quad Cities Interstate Air Quality Control Region.

The Metropolitan Quad Cities Interstate Air Quality Control Region (Illinois-Iowa) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Illinois: Carroll County, Henry County, Mercer County, Rock Island County, Whiteside County.

In the State of Iowa: Clinton County, Louisa County, Muscatine County, Scott County.

§ 81.104 Central Pennsylvania Intrastate Air Quality Control Region.

The Central Pennsylvania Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Pennsylvania: Bedford County, Blair County, Cambria County, Centre County, Clinton County, Columbia County, Fulton County, Huntingdon County, Juniata County, Lycoming County, Mifflin County, Montour County, Northumberland County, Snyder County, Somerset County, Union County.

§ 81.105 South Central Pennsylvania Intrastate Air Quality Control Region.

The South Central Pennsylvania Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f) geographically located within the outermost boundaries of the area so delimited):

In the State of Pennsylvania: Adams County, Cumberland County, Dauphin County, Franklin County, Lancaster County, Lebanon County, Perry County, York County.

§ 81.106 Greenville-Spartanburg Intrastate Air Quality Control Region.

The Greenville-Spartanburg Intrastate Air Quality Control Region (South Carolina) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of South Carolina: Anderson County, Cherokee County, Greenville County, Oconee County, Pickens County, Spartanburg County.

§ 81.107 Greenwood Intrastate Air Quality Control Region.

The Greenwood Intrastate Air Quality Control Region (South Carolina) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of South Carolina: Abbeville County, Edgefield County, Greenwood County, Laurens County, McCormick County, Saluda County.

§ 81.108 Columbia Intrastate Air Quality Control Region.

The Columbia Intrastate Air Quality Control Region (South Carolina) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of South Carolina: Fairfield County, Lexington County, Newberry County, Richland County.

§ 81.109 Florence Intrastate Air Quality Control Region.

The Florence Intrastate Air Quality Control Region (South Carolina) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of South Carolina: Chesterfield County, Darlington County, Dillon County, Florence County, Marion County, Marlboro County.

§ 81.110 Camden-Sumter Intrastate Air Quality Control Region.

The Camden-Sumter Intrastate Air Quality Control Region (South Carolina) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of South Carolina: Clarendon County, Kershaw County, Lee County, Sumter County.

§ 81.111 Georgetown Intrastate Air Quality Control Region.

The Georgetown Intrastate Air Quality Control Region (South Carolina) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of South Carolina: Georgetown County, Horry County, Williamsburg County.

§ 81.112 Charleston Intrastate Air Quality Control Region.

The Charleston Intrastate Air Quality Control Region (South Carolina) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of South Carolina: Berkeley County, Charleston County, Dorchester County.

NOTE: For purposes of identification, the regions are referred to by South Carolina authorities as follows:

Sec.
81.106 Greenville-Spartanburg Intrastate Air Quality Control Region: Region 1.
81.107 Greenwood Intrastate Air Quality Control Region: Region 2.
81.108 Columbia Intrastate Air Quality Control Region: Region 4.
81.109 Florence Intrastate Air Quality Control Region: Region 7.
81.110 Camden-Sumter Intrastate Air Quality Control Region: Region 6.
81.111 Georgetown Intrastate Air Quality Control Region: Region 8.
81.112 Charleston Intrastate Air Quality Control Region: Region 9.

§ 81.113 Savannah (Georgia)-Beaufort (South Carolina) Interstate Air Quality Control Region.

The Savannah (Georgia)-Beaufort (South Carolina) Interstate Air Quality Control Region has been revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of South Carolina: Beaufort County, Colleton County, Hampton County, Jasper County.

In the State of Georgia: Bryan County, Bulloch County, Candler County, Chatham County, Effingham County, Evans County, Liberty County, Tattnall County.

§ 81.114 Augusta (Georgia)-Aiken (South Carolina) Interstate Air Quality Control Region.

The Augusta (Georgia)-Aiken (South Carolina) Interstate Air Quality Control Region has been revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Georgia: Burke County, Columbia County, Emanuel County, Glascock County, Jefferson County, Jenkins County, Lincoln County, McDuffie County, Richmond County, Screven County, Taliaferro County, Warren County, Wilkes County.

In the State of South Carolina: Aiken County, Allendale County, Bamberg County, Barnwell County, Calhoun County, Orangeburg County.

NOTE: For identification purposes, the Columbus (Georgia)-Phenix City (Alabama) Interstate Air Quality Control Region is referred to by Alabama authorities as the Alabama State Capital-Columbus (Georgia) Interstate Air Quality Control Region.

§ 81.115 Northwest Nevada Intrastate Air Quality Control Region.

The Northwest Nevada Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Nevada: Carson City, Douglas County, Lyon County, Storey County, Washoe County.

§ 81.116 Northern Missouri Intrastate Air Quality Control Region.

The Northern Missouri Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Missouri: Adair County, Andrew County, Atchison County, Audrain County, Boone County, Caldwell County, Callaway County, Carroll County, Chariton County, Clark County, Clinton County, Cole County, Cooper County, Daviess County, De Kalb County, Gentry County, Grundy County, Harrison County, Holt County, Howard County, Knox County, Lewis County, Lincoln County, Linn County, Livingston County, Macon County, Marion County, Mercer County, Moniteau County, Monroe County, Montgomery County, Nodaway County, Osage County, Pike County, Putnam County, Ralls County, Randolph County, Saline County, Schuyler County, Scotland County, Shelby County, Sullivan County, Warren County, Worth County.

§ 81.117 Southeast Missouri Intrastate Air Quality Control Region.

The Southeast Missouri Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Missouri: Bolinger County, Butler County, Cape Girardeau County, Carter County, Crawford County, Dent County, Dunklin County, Gasconade County, Iron County, Madison County, Maries County, Mississippi County, New Madrid County, Pemiscot County, Perry County, Phelps County, Reynolds County, Ripley County, St. Francois County, Ste. Genevieve County, Scott County, Stoddard County, Washington County, Wayne County.

§ 81.118 Southwest Missouri Intrastate Air Quality Control Region.

The Southwest Missouri Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Missouri: Barton County, Barry County, Bates County, Benton County, Camden County, Cedar County, Christian County, Dade County, Dallas County, Douglas County, Greene County, Henry County, Hickory County, Howell County, Jasper County, Johnson County, Laclede County, Lafayette County, Lawrence County, McDonald County, Miller County, Morgan County, Newton County, Oregon County, Ozark County, Pettis County, Polk County, Pulaski County, St. Clair County, Shannon County, Stone County, Taney County, Texas County, Vernon County, Webster County, Wright County.

§ 81.119 Western Tennessee Intrastate Air Quality Control Region.

The Western Tennessee Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Tennessee: Benton County, Carroll County, Chester County, Crockett County, Decatur County, Dyer County, Fayette County, Gibson County, Hardeman County, Hardin County, Haywood County, Henderson County, Henry County, Lake County, Lauderdale County, McNairy County, Madison County, Obion County, Tipton County, Weakley County.

§ 81.120 Middle Tennessee Intrastate Air Quality Control Region.

The Middle Tennessee Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Tennessee: Bedford County, Cannon County, Cheatham County, Clay County, Davidson County, De Kalb County, Dickson County, Giles County, Hickman County, Houston County, Humphreys County, Jackson County, Lawrence County, Lewis County, Lincoln County, Macon County, Marshall County, Maury County, Montgomery County, Moore County, Perry County, Robertson County, Rutherford County, Smith County, Stewart County, Sumner County, Trousdale County, Wayne County, Williamson County, Wilson County.

§ 81.121 Four Corners Interstate Air Quality Control Region.

The Four Corners Interstate Air Quality Control Region (Colorado-New Mexico-Utah) has been revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Colorado: Archuleta County, Dolores County, La Plata County, Montezuma County, San Juan County.

In the State of New Mexico: San Juan County (in its entirely); Rio Arriba County (that portion lying west (Pacific slope) of the Continental Divide, and all portions of the Jicarilla Apache Indian Reservation lying east (Atlantic slope) of the Continental Divide); Sandoval County (that portion lying west (Pacific slope) of the Continental Divide, and all portions of the Jicarilla Apache Indian Reservation lying east (Atlantic slope) of the Continental Divide); McKinley County (that portion lying west (Pacific slope) of the Continental Divide); Valencia County (that portion lying within the Zuni and Ramah Navajo Indian Reservations).

In the State of Utah: Emery County, Garfield County, Grand County, Iron County, Kane County, San Juan County, Washington County, Wayne County.

(Secs. 107, 110, and 301(a) of the Clean Air Act, as amended(42 U.S.C. 7407, 7410, 7601(a)))

[45 FR 67347, Oct. 10, 1980]

§ 81.122 Mississippi Delta Intrastate Air Quality Control Region.

The Mississippi Delta Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Mississippi: Bolivar County, Coahoma County, Humphreys County, Issaquena County, Leflore County, Quitman County, Sharkey County, Sunflower County, Tallahatchie County, Tunica County, Washington County, Yazoo County.

§ 81.123 Southeastern Oklahoma Intrastate Air Quality Control Region.

The Southeastern Oklahoma Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Oklahoma: Atoka County, Bryan County, Carter County, Choctaw County, Coal County, Garvin County, Haskell County, Hughes County, Johnston County, Latimer County, Love County, McIntosh County, Marshall County, Murray County, Okfuskee County, Pittsburg County, Pontotoc County, Pushmataha County, Seminole County.

§ 81.124 North Central Oklahoma Intrastate Air Quality Control Region.

The North Central Oklahoma Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Oklahoma: Garfield County, Grant County, Kay County, Noble County, Payne County.

§ 81.125 Southwestern Oklahoma Intrastate Air Quality Control Region.

The Southwestern Oklahoma Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Oklahoma: Beckham County, Caddo County, Comanche County, Cotton County, Greer County, Harmon County, Jackson County, Jefferson County, Kiowa County, Stephens County, Tillman County, Washita County.

§ 81.126 Northwestern Oklahoma Intrastate Air Quality Control Region.

The Northwestern Oklahoma Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located

within the outermost boundaries of the area so delimited):

In the State of Oklahoma: Alfalfa County, Beaver County, Blaine County, Cimarron County, Custer County, Dewey County, Ellis County, Harper County, Major County, Roger Mills County, Texas County, Woods County, Woodward County.

§ 81.127 Central New York Intrastate Air Quality Control Region.

The Central New York Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of New York: Cayuga County, Cortland County, Herkimer County, Jefferson County, Lewis County, Madison County, Oneida County, Onondaga County, Oswego County.

§ 81.128 Genesee-Finger Lakes Intrastate Air Quality Control Region.

The Genesee-Finger Lakes Intrastate Air Quality Control Region (New York) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of New York: Genesee County, Livingston County, Monroe County, Ontario County, Orleans County, Seneca County, Wayne County, Wyoming County, Yates County.

§ 81.129 Hudson Valley Intrastate Air Quality Control Region.

The Hudson Valley Intrastate Air Quality Control Region (New York) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of New York: Albany County, Columbia County, Dutchess County, Fulton County, Greene County, Montgomery County, Orange County, Putnam County, Rensselaer County, Saratoga County, Schenectady County, Schoharie County, Ulster County.

§ 81.130 Southern Tier East Intrastate Air Quality Control Region.

The Southern Tier East Intrastate Air Quality Control Region (New York) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of New York: Broome County, Chenango County, Delaware County, Otsego County, Sullivan County, Tioga County.

§ 81.131 Southern Tier West Intrastate Air Quality Control Region.

The Southern Tier West Intrastate Air Quality Control Region (New York) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of New York: Allegany County, Cattaraugus County, Chautauqua County, Chemung County, Schuyler County, Steuben County, Tompkins County.

§ 81.132 Abilene-Wichita Falls Intrastate Air Quality Control Region.

The Abilene-Wichita Falls Intrastate Air Quality Control Region (Texas) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located

within the outermost boundaries of the area so delimited):

In the State of Texas: Archer County, Baylor County, Brown County, Callahan County, Childress County, Clay County, Coleman County, Comanche County, Cottle County, Eastland County, Fisher County, Foard County, Hardeman County, Haskell County, Jack County, Jones County, Kent County, Knox County, Mitchell County, Montague County, Nolan County, Runnels County, Scurry County, Shackleford County, Stephens County, Stonewall County, Taylor County, Throckmorton County, Wichita County, Wilbarger County, Young County.

§ 81.133 Amarillo-Lubbock Intrastate Air Quality Control Region.

The Amarillo-Lubbock Intrastate Air Quality Control Region (Texas) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Texas: Armstrong County, Bailey County, Briscoe County, Carson County, Castro County, Cochran County, Collingsworth County, Crosby County, Dallam County, Deaf Smith County, Dickens County, Donley County, Floyd County, Garza County, Gray County, Hale County, Hall County, Hansford County, Hartley County, Hemphill County, Hockley County, Hutchinson County, King County, Lamb County, Lipscomb County, Lubbock County, Lynn County, Moore County, Motley County, Ochiltree County, Oldham County, Parmer County, Potter County, Randall County, Roberts County, Sherman County, Swisher County, Terry County, Wheeler County, Yoakum County.

§ 81.134 Austin-Waco Intrastate Air Quality Control Region.

The Austin-Waco Intrastate Air Quality Control Region (Texas) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Texas: Bastrop County, Bell County, Blanco County, Bosque County, Brazos County, Burleson County, Burnet County, Caldwell County, Coryell County, Falls County, Fayette County, Freestone County, Grimes County, Hamilton County, Hays County, Hill County, Lampasas County, Lee County, Leon County, Limestone County, Llano County, McLennan County, Madison County, Milam County, Mills County, Robertson County, Travis County, Washington County, Williamson County.

§ 81.135 Brownsville-Laredo Intrastate Air Quality Control Region.

The Brownsville-Laredo Intrastate Air Quality Control Region (Texas) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area aso delimited):

In the State of Texas: Cameron County, Hidalgo County, Jim Hogg County, Starr County, Webb County, Willacy County, Zapata County.

§ 81.136 Corpus Christi-Victoria Intrastate Air Quality Control Region.

The Corpus Christi-Victoria Intrastate Air Quality Control Region (Texas) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Texas: Aransas County, Bee County, Brooks County, Calhoun County, De Witt County, Duval County, Goliad County, Jackson County, Jim Wells County, Kenedy County, Kleberg County, Lavaca County, Live Oak County, McMullen County, Nueces County, Refugio County, San Patricio County, Victoria County.

§ 81.137 Midland-Odessa-San Angelo Intrastate Air Quality Control Region.

The Midland-Odessa-San Angelo Intrastate Air Quality Control Region (Texas) consists of the territorial area encompassed by the boundaries of the

following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(e)) geographically located within the outermost boundaries of the area so delimited):

In the State of Texas: Andrews County, Borden County, Coke County, Concho County, Crane County, Crockett County, Dawson County, Ector County, Gaines County, Glasscock County, Howard County, Irion County, Loving County, Martin County, McCulloch County, Menard County, Midland County, Pecos County, Reagan County, Reeves County, San Saba County, Schleicher County, Sterling County, Sutton County, Terrell County, Tom Green County, Upton County, Ward County, Winkler County.

§ 81.138 Central Arkansas Intrastate Air Quality Control Region.

The Central Arkansas Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Arkansas: Chicot County, Clark County, Cleveland County, Conway County, Dallas County, Desha County, Drew County, Faulkner County, Garland County, Grant County, Hot Spring County, Jefferson County, Lincoln County, Lonoke County, Perry County, Pope County, Pulaski County, Saline County, Yell County.

§ 81.139 Northeast Arkansas Intrastate Air Quality Control Region.

The Northeast Arkansas Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Arkansas: Arkansas County, Clay County, Craighead County, Cross County, Greene County, Independence County, Jackson County, Lawrence County, Lee County, Mississippi County, Monroe County, Phillips County, Poinsett County, Prairie County, Randolph County, Saint Francis County, Sharp County, White County, Woodruff County.

§ 81.140 Northwest Arkansas Intrastate Air Quality Control Region.

The Northwest Arkansas Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Arkansas: Baxter County, Boone County, Carroll County, Cleburne County, Franklin County, Fulton County, Izard County, Johnson County, Logan County, Madison County, Marion County, Montgomery County, Newton County, Pike County, Polk County, Scott County, Searcy County, Stone County, Van Buren County.

§ 81.141 Berkshire Intrastate Air Quality Control Region.

The Berkshire Intrastate Air Quality Control Region (Massachusetts) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Massachusetts: Berkshire County.

§ 81.142 Central Massachusetts Intrastate Air Quality Control Region.

The Central Massachusetts Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Massachusetts: Township—Ashburnham, Ashby, Athol, Auburn,

Barre, Berlin, Blackstone, Boylston, Brookfield, Charlton, Clinton, Douglas, Dudley, East Brookfield, Grafton, Hardwick, Harvard, Holden, Hopedale, Hubbardston, Lancaster, Leicester, Lunenburg, Mendon, Millbury, Millville, New Braintree, Northborough, Northbridge, North Brookfield, Oakham, Oxford, Paxton, Petersham, Phillipston, Princeton, Royalston, Rutland, Shirley, Shrewsbury, Southbridge, Spencer, Sterling, Sturbridge, Sutton, Templeton, Townsend, Upton, Uxbridge, Warren, Webster, Westborough, West Boylston, West Brookfield, Westminster, Winchendon.

Cities—Fitchburg, Gardner, Leominster, Worcester.

§ 81.143 Central Virginia Intrastate Air Quality Control Region.

The Central Virginia Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Virginia: Counties—Amelia, Amherst, Appomattox, Bedford, Brunswick, Buckingham, Campbell, Charlotte, Cumberland, Franklin, Halifax, Henry, Lunenburg, Mecklenburg, Nottoway, Patrick, Pittsylvania, Prince Edward.

Cities—Bedford, Danville, Lynchburg, Martinsville, South Boston.

Towns—Blackstone, Farmville, Rocky Mount, South Hill.

§ 81.144 Northeastern Virginia Intrastate Air Quality Control Region.

The Northeastern Virginia Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Virginia: Counties—Accomack, Albermarle, Caroline, Culpeper, Essex, Fauquier, Fluvanna, Gloucester, Greene, King and Queen, King George, King William, Lancaster, Louisa, Madison, Mathews, Middlesex, Nelson, Northampton, Northumberland, Orange, Rappahannock, Richmond, Spotsylvania, Stafford, Westmoreland.

Cities—Charlottesville, Fredericksburg.

Towns—Culpeper, Warrenton.

§ 81.145 State Capital Intrastate Air Quality Control Region.

The State Capital Intrastate Air Quality Control Region (Virginia) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Virginia: Counties—Charles City, Chesterfield, Dinwiddie, Goochland, Greensville, Hanover, Henrico, New Kent, Powhatan, Prince George, Surry, Sussex.

Cities—Colonial Heights, Emporia, Hopewell, Petersburg, Richmond.

§ 81.146 Valley of Virginia Intrastate Air Quality Control Region.

The Valley of Virginia Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Virginia: Counties—Alleghany, Augusta, Bath, Botetourt, Clarke, Craig, Floyd, Frederick, Giles, Highland, Montgomery, Page, Pulaski, Roanoke, Rockbridge, Rockingham, Shenandoah, Warren.

Cities—Buena Vista, Clifton Forge, Covington, Harrisonburg, Lexington, Radford, Roanoke, Salem, Staunton, Waynesboro, Winchester.

Towns—Blacksburg, Christiansburg, Front Royal, Luray, Pulaski, Vinton.

§ 81.147 Eastern Mountain Intrastate Air Quality Control Region.

The Eastern Mountain Intrastate Air Quality Control Region (North Carolina) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically locat-

ed within the outermost boundaries of the area so delimited):

In the State of North Carolina: Alexander County, Alleghany County, Ashe County, Avery County, Burke County, Caldwell County, Catawba County, Cleveland County, McDowell County, Mitchell County, Polk County, Rutherford County, Watauga County, Wilkes County, Yancey County.

§ 81.148 Eastern Piedmont Intrastate Air Quality Control Region.

The Eastern Piedmont Intrastate Air Quality Control Region (North Carolina) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of North Carolina: Chatham County, Durham County, Edgecombe County, Franklin County, Granville County, Halifax County, Johnston County, Lee County, Nash County, Northampton County, Orange County, Person County, Vance County, Wake County, Warren County, Wilson County.

§ 81.149 Northern Coastal Plain Intrastate Air Quality Control Region.

The Northern Coastal Plain Intrastate Air Quality Control Region (North Carolina) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of North Carolina: Beaufort County, Bertie County, Camden County, Chowan County, Currituck County, Dare County, Gates County, Hertford County, Hyde County, Martin County, Pasquotank County, Perquimans County, Pitt County, Tyrrell County, Washington County.

§ 81.150 Northern Piedmont Intrastate Air Quality Control Region.

The Northern Piedmont Intrastate Air Quality Control Region (North Carolina) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of North Carolina: Alamance County, Caswell County, Davidson County, Davie County, Forsyth County, Guilford County, Randolph County, Rockingham County, Stokes County, Surry County, Yadkin County.

§ 81.151 Sandhills Intrastate Air Quality Control Region.

The Sandhills Intrastate Air Quality Control Region (North Carolina) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of North Carolina: Anson County, Bladen County, Cumberland County, Harnett County, Hoke County, Montgomery County, Moore County, Richmond County, Robeson County, Sampson County, Scotland County.

§ 81.152 Southern Coastal Plain Intrastate Air Quality Control Region.

The Southern Coastal Plain Intrastate Air Quality Control Region (North Carolina) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of North Carolina: Brunswick County, Carteret County, Columbus County, Craven County, Duplin County, Greene County, Jones County, Lenoir County, New Hanover County, Onslow County, Pamlico County, Pender County, Wayne County.

§ 81.153 Western Mountain Intrastate Air Quality Control Region.

The Western Mountain Intrastate Air Quality Control Region (North

Carolina) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located with the outermost boundaries of the area so delimited):

In the State of North Carolina: Buncombe County, Cherokee County, Clay County, Graham County, Haywood County, Henderson County, Jackson County, Macon County, Madison County, Swain County, Transylvania County.

§ 81.154 Eastern Shore Intrastate Air Quality Control Region.

The Eastern Shore Intrastate Air Quality Control Region (Maryland) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Maryland: Caroline County, Cecil County, Dorchester County, Kent County, Queen Annes County, Somerset County, Talbot County, Wicomico County, Worcester County.

§ 81.155 Central Maryland Intrastate Air Quality Control Region.

The Central Maryland Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described areas (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Maryland: Frederick County.

§ 81.156 Southern Maryland Intrastate Air Quality Control Region.

The Southern Maryland Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Maryland: Calvert County, Charles County, St. Marys County.

§ 81.157 North Central Wisconsin Intrastate Air Quality Control Region.

The North Central Wisconsin Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Wisconsin: Adams County, Forest County, Florence County, Juneau County, Langlade County, Lincoln County, Marathon County, Oneida County, Portage County, Vilas County, Wood County.

§ 81.158 Southern Wisconsin Intrastate Air Quality Control Region.

The Southern Wisconsin Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Wisconsin: Columbia County, Dane County, Dodge County, Green County, Iowa County, Jefferson County, Lafayette County, Richland County, Sauk County.

§ 81.159 Great Basin Valley Intrastate Air Quality Control Region.

The Great Basin Valley Intrastate Air Quality Control Region (California) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of California: Alpine County, Inyo County, Mono County.

§ 81.160 North Central Coast Intrastate Air Quality Control Region.

The North Central Coast Intrastate Air Quality Control Region (California) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of California: Monterey County, San Benito County, Santa Cruz County.

§ 81.161 North Coast Intrastate Air Quality Control Region.

The North Coast Intrastate Air Quality Control Region (California) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of California: Del Norte County, Humboldt County, Mendocino County, Trinity County.

Sonoma County—that portion of Sonoma County which lies north and west of a line described as follows:

Beginning at the southeasterly corner of the Rancho Estero Americano, being on the boundary line between Marin and Sonoma counties, California; thence running northerly along the easterly boundary line of said Rancho Estero Americano to the northeasterly corner thereof, being an angle corner in the westerly boundary line of Rancho Canada de Jonive; thence running along said boundary of Rancho Canada de Jonive westerly, northerly and easterly to its intersection with the easterly line of Graton Road; thence running along the easterly and southerly line of Graton Road, northerly and easterly to its intersection with the easterly line of Sullivan Road; thence running northerly along said easterly line of Sullivan Road to the southerly line of Green Valley Road; thence running easterly along the said southerly line of Green Valley Road and easterly along the southerly line of State highway 116, to the westerly line of Vine Hill Road; thence running along the westerly and northerly line of Vine Hill Road, northerly and easterly to its intersection with the westerly line of Laguna Road; thence running northerly along the westerly line of Laguna Road and the northerly projection thereof to the northerly line of Trenton Road; thence running westerly along the northerly line of said Trenton Road to the easterly line of Trenton-Healdsburg Road; thence running northerly along said easterly line of Trenton-Healdsburg Road to the easterly line of Eastside Road; thence running northerly along said easterly line of Eastside Road to its intersection with the southerly line of Rancho Sotoyome; thence running easterly along said southerly line of Rancho Sotoyome to is intersection with the township line common to Townships 8 and 9 North, Mt. Diablo Base and Meridian; thence running easterly along said township line to its intersection with the boundary line between Sonoma and Napa Counties, State of California.

[36 FR 22421, Nov. 25, 1971, as amended at 46 FR 3890, Jan. 16, 1981]

§ 81.162 Northeast Plateau Intrastate Air Quality Control Region.

The Northeast Plateau Intrastate Air Quality Control Region (California) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of California: Lassen County, Modoc County, Siskiyou County.

Shasta County—that portion of Shasta County which lies east and north of a line described as follows:

Beginning at the Shasta-Siskiyou County boundary and running south along the range line common to R. 2 E. and R. 1 E., Mt. Diablo Base and Meridian, to the southwest corner of T. 35 N., R. 2 E; then east along the township line common to T. 35 N. and T. 34 N. to the northwest corner of T. 34 N., R. 3 E.; then south along the range line common to R. 3 E. and R. 2 E. to the southwest corner of T. 33 N., R. 3 E.; then east along the township line common to T. 33 N. and T. 32 N. to the northwest corner of T. 32 N., R. 4 E.; then south along the range line common to R. 4 E. and R. 3 E. to the point of intersection with the northwest

corner of the Lassen Volcanic National Park boundary; then east along the north boundary of Lassen Volcanic National Park to the point of intersection with the Lassen-Shasta County boundary.

[36 FR 22421, Nov. 25, 1971, as amended at 46 FR 3890, Jan. 16, 1981]

§ 81.163 Sacramento Valley Intrastate Air Quality Control Region.

The Sacramento Valley Intrastate Air Quality Control Region (California) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of California: Butte County, Colusa County, Glenn County, Sacramento County, Sutter County, Tehama County, Yolo County, Yuba County.

Shasta County—that portion of Shasta County which lies west and south of a line described as follows:

Beginning at the Shasta-Siskiyou County boundary and running south along the range line common to R. 2 E. and R. 1 E., Mt. Diablo Base and Meridian, to the southwest corner of T. 35 N., R. 2 E.; then east along the township line common to T. 35 N. and T. 34 N. to the northwest corner of T. 34 N., R. 3 E.; then south along the range line common to R. 3 E. and R. 2 E. to the southwest corner of T. 33 N., R. 3 E.; then east along the township line common to T. 33 N. and T. 32 N. to the northwest corner of T. 32 N., R. 4 E.; then south along the range line common to R. 4 E. and R. 3 E. to the point of intersection with the northwest corner of the Lassen Volcanic National Park boundary; then east along the north boundary of Lassen Volcanic National Park to the Point of intersection with the Lassen-Shasta County boundary.

Solano County—that portion of Solano County which lies north and east of a line described as follows:

Beginning at the inersection of the westerly boundary of Solano County and the ¼ section line running east and west through the center of Section 34, T. 6 N., R. 2 W., M.D.B.&M., thence east along said ¼ section line to the east boundary of Section 36, T. 6 N., R. 2 W., thence south ½ mile and east 2.0 miles, more or less, along the west and south boundary of Los Putos Rancho to the northwest corner of Section 4, T. 5 N., R. 1 W., thence east along a line common to T. 5 N. and T. 6 N. to the northeast corner of Section 3, T. 5 N., R. 1 E., thence south along section lines to the southeast corner of Section 8, T. 3 N., R. 2 E., thence east to the boundary between Solano and Sacramento Counties.

[36 FR 22421, Nov. 25, 1971, as amended at 46 FR 3890, Jan. 16, 1981]

§ 81.164 San Diego Intrastate Air Quality Control Region.

The San Diego Intrastate Air Quality Control Region (California) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of California: San Diego County.

[36 FR 22421, Nov. 25, 1971, as amended at 46 FR 3890, Jan. 16, 1981]

§ 81.165 San Joaquin Valley Intrastate Air Quality Control Region.

The San Joaquin Valley Intrastate Air Quality Control Region (California) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of California: Fresno County, Kings County, Madera County, Merced County, San Joaquin County, Stanislaus County, Tulare County.

Kern County—that portion of Kern County which lies west and north of a line described as follows:

Beginning at the Kern-Los Angeles County boundary and running north and east along the northwest boundary of the Rancho La Liebre Land Grant to the point of intersection with the range line common to R. 15 W. and R. 16 W., San Bernardino Base and Meridian; then north along the range line to the northwest corner of Sec-

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tion 2, T. 32 S., R. 32 E., Mount Diablo Base and Meridian; then east along the township line common to T. 32 S. and T. 31 S.; then north along the range line common to R. 35 E. and R. 34 E.; then east along the township line common to T. 29 S. and T. 28 S.; then north along the range line common to R. 36 E. and R. 35 E.; then east along the township line common to T. 28 S. and T. 27 S.; then north along the range line common to R. 37 E. and R. 36 E. to the Kern-Tulare County boundary.

[36 FR 22421, Nov. 25, 1971, as amended at 46 FR 3890, Jan. 16, 1981]

§ 81.166 South Central Coast Intrastate Air Quality Control Region.

The South Central Coast Intrastate Air Quality Control Region (California) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of California: San Luis Obispo County.

Santa Barbara County—that portion of Santa Barbara County which lies north of a line described as follows:

Beginning at the Pacific Ocean outfall of Jalama Creek and running east and north along Jalama Creek to a point of intersection with the west boundary of the San Julian Land Grant; then south along the San Julian Land Grant boundary to its southwest corner; then east along the south boundary of the San Julian Land Grant to the northeast corner of partial sec. 20, T. 5 N., R. 32 W., San Bernardino Base and Meridian; then south and east along the boundary of the Las Cruces Land Grant to the southwest corner of partial sec. 22, T. 5 N., R. 32 W.; then northeast along the Las Cruces Land Grant boundary; then east along the north boundaries of sec. 13, T. 5 N., R. 32 W., and secs. 18, 17, 16, 15, 14, 13, T. 5 N., R. 31 W., and secs. 18, 17, 16, 15, 14, 13, T. 5 N., R. 30 W., and secs. 18, 17, 16, 15, T. 5 N., R. 29 W.; then south along the east boundary of sec. 15 T. 5 N., R. 29 W.; then east along the north boundaries of secs. 23 and 24, T. 5 N., R. 29 W., and secs. 19, 20, 21, 22, 23, 24, T. 5 N., R. 28 W., and secs. 19 and 20, T. 5 N., R. 27 W.; then south along the east boundary of sec. 20, T. 5 N., R. 27 W.; then east along the north boundaries of secs. 28, 27, 26, 25, T. 5 N., R. 27 W. and sec. 30, T. 5 N., R. 26 W.; then south along the east boundary of sec. 30, T. 5 N., R. 26 W.; then east along the north boundaries of secs. 32, 33, 34, 35, T. 5 N., R. 26 W.; then south along the east boundary of sec. 35, T. 5 N., R. 26 W. to the township line common to T. 4 N. and T. 5 N.; then east along this township line to the Santa Barbara-Ventura County boundary.

§ 81.167 Southeast Desert Intrastate Air Quality Control Region.

The Southeast Desert Intrastate Air Quality Control Region (California) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of California: Imperial County.

Kern County—that portion of Kern County which lies east and south of a line described as follows:

Beginning at the Kern-Los Angeles County boundary and running north and east along the northwest boundary of the Rancho La Liebre Land Grant to the point of intersection with the range line common to R. 15 W. and R. 16 W., San Bernardino Base and Meridian; then north along the range line to the northwest corner of Section 2, T. 32 S., R. 32 E., Mount Diablo Base and Meridian; then east along the township line common to T. 32 S. and T. 31 S.; then north along the range line common to R. 35 E. and R. 34 E.; then east along the township line common to T. 29 S. and T. 28 S.; then north along the range line common to R. 36 E. and R. 35 E.; then east along the township line common to T. 28 S. and T. 27 S.; then north along the range line common to R. 37 E. and R. 36 E. to the Kern-Tulare County boundary.

Los Angeles County—that portion of Los Angeles County which lies north and east of a line described as follows:

Beginning at the Los Angeles-San Bernardino County boundary and running west along the township line common to T. 3 N. and T. 2 N., San Bernardino Base and Meridian; then north along the range line common to R. 8 W. and R. 9 W.; then west along the township line common to T. 4 N. and T. 3 N.; then north along the range line common to R. 12 W. and R. 13 W. to the southeast corner of Section 12, T. 5 N.; R. 13 W.; then west along the south boundaries of Sections 12, 11, 10, 9, 8, and 7, T. 5 N., R. 13

W. to the boundary of the Angeles National Forest which is collinear with the range line common to R. 13 W. and R. 14 W.; then north and west along the Angeles National Forest boundary to the point of intersection with the township line common to T. 7 N. and T. 6 N. (point is at the northwest corner of Section 4 in T. 6 N., R. 14 W.); then west along the township line common to T. 7 N. and T. 6 N.; then north along the range line common to R. 15 W. and R. 16 W. to the southeast corner of Section 13, T. 7 N., R. 16 W.; then along the south boundaries of Sections 13, 14, 15, 16, 17, and 18, T. 7 N., R. 16 W.; then north along the range line common to R. 16 W. and R. 17 W. to the north boundary of the Angeles National Forest (collinear with the township line common to T. 8 N. and T. 7 N.); then west and north along the Angeles National Forest boundary to the point of intersection with the south boundary of the Rancho La Liebre Land Grant; then west and north along this land grant boundary to the Los Angeles-Kern County boundary.

Riverside County—that portion of Riverside County which lies east of a line described as follows:

Beginning at the Riverside-San Diego County boundary and running north along the range line common to R. 4 E. and R. 3 E., San Bernardino Base and Meridian; then east along the township line common to T. 8 S. and T. 7 S.; then north along the range line common to R. 5 E. and R. 4 E.; then west along the township line common to T. 6 S. and T. 7 S. to the southwest corner of Section 34, T. 6 S., R. 4 E.; then north along the west boundaries of Sections 34, 27, 22, 15, 10, and 3, T. 6 S., R. 4 E.; then west along the township line common to T. 5 S. and T. 6 S.; then north along the range line common to R. 4 E. and R. 3 E.; then west along the south boundaries of Sections 13, 14, 15, 16, 17, and 18, T. 5 S., R. 3 E.; then north along the range line common to R. 2 E. and R. 3 E.; then west along the township line common to T. 4 S. and T. 3 S. to the intersection with the southwest boundary of partial Section 31, T. 3 S., R. 1 W.; then northwest along that line to the intersection with the range line common to R. 2 W. and R. 1 W.; then north to the Riverside-San Bernardino County line.

San Bernardino County—that portion of San Bernardino County which lies east and north of a line described as follows:

Beginning at the San Bernardino-Riverside County boundary and running north along the range line common to R. 3 E. and R. 2 E., San Bernardino Base and Meridian; then west along the township line common to T. 3 N. and T. 2 N. to the San Bernardino-Los Angeles County boundary.

[36 FR 22421, Nov. 25, 1971, as amended at 46 FR 3890, Jan. 16, 1981]

§ 81.168 Great Falls Intrastate Air Quality Control Region.

The Great Falls Intrastate Air Quality Control Region (Montana) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Montana: Blaine County, Cascade County, Chouteau County, Glacier County, Hill County, Liberty County, Pondera County, Teton County, Toole County.

§ 81.169 Helena Intrastate Air Quality Control Region.

The Helena Intrastate Air Quality Control Region (Montana) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Montana: Beaverhead County, Broadwater County, Deer Lodge County, Gallatin County, Granite County, Jefferson County, Lewis and Clark County, Madison County, Meagher County, Park County, Powell County, Silver Bow County.

§ 81.170 Miles City Intrastate Air Quality Control Region.

The Miles City Intrastate Air Quality Control Region (Montana) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Montana: Carter County, Custer County, Daniels County, Dawson County, Fallon County, Garfield County, McCone County, Phillips County, Powder

River County, Prairie County, Richland County, Roosevelt County, Rosebud County, Sheridan County, Treasure County, Valley County, Wibaux County.

§ 81.171 Missoula Intrastate Air Quality Control Region.

The Missoula Intrastate Air Quality Control Region (Montana) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Montana: Flathead County, Lake County, Lincoln County, Mineral County, Missoula County, Ravalli County, Sanders County.

§ 81.172 Comanche Intrastate Air Quality Control Region.

The Comanche Intrastate Air Quality Control Region (Colorado) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Colorado: Baca County, Bent County, Cheyenne County, Crowley County, Elbert County, Kiowa County, Kit Carson County, Lincoln County, Otero County, Prowers County.

§ 81.173 Grand Mesa Intrastate Air Quality Control Region.

The Grand Mesa Intrastate Air Quality Control Region (Colorado) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f) geographically located within the outermost boundaries of the area so delimited):

In the State of Colorado: Delta County, Eagle County, Garfield County, Gunnison County, Hinsdale County, Mesa County, Montrose County, Ouray County, Pitkin County, San Miguel County, Summit County.

§ 81.174 Pawnee Intrastate Air Quality Control Region.

The Pawnee Intrastate Air Quality Control Region (Colorado) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Colorado: Larimer County, Logan County, Morgan County, Phillips County, Sedgwick County, Washington County, Weld County, Yuma County.

§ 81.175 San Isabel Intrastate Air Quality Control Region.

The San Isabel Intrastate Air Quality Control Region (Colorado) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Colorado: Chaffee County, Custer County, El Paso County, Fremont County, Huerfano County, Lake County, Las Animas County, Park County, Pueblo County, Teller County.

§ 81.176 San Luis Intrastate Air Quality Control Region.

The San Luis Intrastate Air Quality Control Region (Colorado) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Colorado: Alamosa County, Conejos County, Costilla County, Mineral County, Rio Grande County, Saguache County.

§ 81.177 Yampa Intrastate Air Quality Control Region.

The Yampa Intrastate Air Quality Control Region (Colorado) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Colorado: Grand County, Jackson County, Moffat County, Rio Blanco County, Routt County.

§ 81.178 Southern Delaware Intrastate Air Quality Control Region.

The Southern Delaware Intrastate Air Quality Control Region (Delaware) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described areas (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Delaware: Kent County, Sussex County.

§ 81.179 Aroostook Intrastate Air Quality Control Region.

The Aroostook Intrastate Air Quality Control Region (Maine) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Maine:

Aroostook County—That portion of Aroostook County which lies east of a line described as follows: Beginning at the point where the Maine-Canadian international border is intersected by a line common to the western boundary of Fort Kent Township and running due south to the intersection of said line with the Aroostook-Penobscot County boundary.

§ 81.181 Down East Intrastate Air Quality Control Region.

The Down East Intrastate Air Quality Control Region (Maine) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Maine: Hancock County, Washington County.

Penobscot County—That portion of Penobscot County which lies south of a line described as follows: Beginning at the point where the Penobscot-Aroostook County boundary is intersected by a line common to the boundaries of Patten and Stacyville Townships and running due west to the intersection of said line with Penobscot-Piscataquis County boundary.

Piscataquis County—That portion of Piscataquis County which lies south and east of a line described as follows: Beginning at the point where the Somerset-Piscataquis County boundary is intersected by a line common to the northern boundary of Blanchard Plantation and running northeast along the northern boundary of Blanchard Plantation to the northeast corner of Blanchard Plantation; then northwest along the western boundary of Monson Township to the northwest corner of Monson Township; then northeast along the northern boundaries of Monson, Willimantic, and Bowerbank Townships, the northern boundary of Barnard Plantation, the northern boundaries of Williamsburg and Brownville Townships, and the northern boundary of Lake View Plantation to the intersection of said line with Piscataquis-Penobscot County boundary, which is also common to the northeast corner of Lake View Plantation.

§ 81.182 Northwest Maine Intrastate Air Quality Control Region.

The Northwest Maine Intrastate Air Quality Control Region (Maine) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Maine:

Aroostook County—That portion of Aroostook County which lies west of a line described as follows: Beginning at the point where the Maine-Canadian international border is intersected by a line common to the western boundary of Fort Kent Township and running due south to the intersection of the said line with the Aroostook-Penobscot County boundary.

Franklin County—That portion of Franklin County which lies north and west of a line described as follows: Beginning at the point where the Oxford-Franklin County boundary is intersected by a line common to the northern boundary of Township No. 6, Phillips Town, Salem Township, and Freeman Township to the intersection of the said line with the Franklin-Somerset County boundary, which is also common to the northeast corner of Freeman Township.

Oxford County—That portion of Oxford County which lies north and west of a line described as follows: Beginning at the point where the Maine-New Hampshire border is intersected by a line common to the northern boundary of Grafton Township, and running northeast along the northern boundaries of Grafton Township and Andover North Surplus to the intersection of said line with the Oxford-Franklin County boundary, which is also the northeast corner of Andover North Surplus.

Penobscot County—That portion of Penobscot County which lies north of a line described as follows: Beginning at the point where the Penobscot-Aroostook County boundary is intersected by a line common to the boundaries of Patten and Stacyville Townships, and running due west to the intersection of said line with the Penobscot-Piscataquis County boundary.

Piscataquis County—That portion of Piscataquis County which lies north and west of a line described as follows: Beginning at the point where the Somerset-Piscataquis County boundary is intersected by a line common to the northern boundary of Blanchard Plantation and running northeast along the northern boundary of Blanchard Plantation to the northeast corner of Blanchard Plantation; then northwest along the western boundary of Monson Township to the northweast corner of Monson Township; then northeast along the northern boundaries of Monson, Williimantic, and Bowerbank Townships, the northern boundary of Barnard Plantation, the northern boundaries of Williamsburg and Brownville Townships, and the northern boundary of Lake View Plantation to the intersection of said line with the Piscataquis-Penobscot County boundary, which is also common to the northeast corner of Lake View Plantation.

Somerset County—That portion of Somerset County which lies north and west of a line described as follows: Beginning at the point where the Somerset-Franklin County boundary is intersected by a line common to the northern boundary of New Portland Township and running northeast along the northern boundaries of New Portland, Embden, Solon, and Athens Townships to the intersection of said line with the Somerset-Piscataquis County boundary, which is common to the northeast corner of Athens Township.

§ 81.183 Eastern Connecticut Intrastate Air Quality Control Region.

The Eastern Connecticut Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Connecticut: Towns—Ashford, Bozrah, Brooklyn, Canterbury, Chaplin, Chester, Clinton, Colchester, Columbia, Coventry, Deep River, Eastford, East Lyme, Essex, Franklin, Griswold, Groton, Hampton, Killingly, Killingworth, Lebanon, Ledyard, Lisbon, Lyme, Mansfield, Montville, North Stonington, Old Lyme, Old Saybrook, Plainfield, Pomfret, Preston, Putnam, Salem, Scotland, Sprague, Stafford, Sterling, Stonington, Thompson, Union, Voluntown, Waterford, Westbrook, Willington, Windham, Woodstock.

Cities—Groton, New London, Norwich, Putnam, Willimantic.

§ 81.184 Northwestern Connecticut Intrastate Air Quality Control Region.

The Northwestern Connecticut Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Connecticut: Towns—Barkhamsted, Canaan, Colebrook, Cornwall, Goshen, Hartland, Harwinton, Kent, Litchfield, Morris, New Hartford, Norfolk, North Canaan, Roxbury, Salisbury, Sharon, Warren, Washington, Winchester.

Cities—Torrington, Winsted.

(Secs. 110, 172, and 301 of the Clean Air Act, as amended)

[36 FR 22421, Nov. 25, 1971, as amended at 45 FR 84788, Dec. 23, 1980]

§ 81.185 Northern Washington Intrastate Air Quality Control Region.

The Northern Washington Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Washington: Chelan County, Douglas County, Ferry County, Okanogan County, Pend Oreille County, Stevens County.

§ 81.187 Olympic-Northwest Washington Intrastate Air Quality Control Region.

The Olympic-Northwest Washington Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Washington: Clallam County, Grays Harbor County, Island County, Jefferson County, Mason County, Pacific County, San Juan County, Skagit County, Thurston County, Whatcom County.

§ 81.189 South Central Washington Intrastate Air Quality Control Region.

The South Central Washington Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Washington: Benton County, Franklin County, Kittitas County, Klickitat County, Walla Walla County, Yakima County.

§ 81.190 Eastern Idaho Intrastate Air Quality Control Region.

The Eastern Idaho Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Idaho: Bannock County, Bear Lake County, Bingham County, Bonneville County, Butte County, Caribou County, Clark County, Franklin County, Fremont County, Jefferson County, Madison County, Oneida County, Power County, Teton County.

§ 81.191 Appalachian Intrastate Air Quality Control Region.

The Appalachian Intrastate Air Quality Control Region (Kentucky) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Kentucky: Bell County, Breathitt County, Clay County, Floyd County, Harlan County, Jackson County, Johnson County, Knott County, Knox County, Laurel County, Lee County, Leslie County, Letcher County, Magoffin County, Martin County, Owsley County, Perry County, Pike County, Rockcastle County, Whitley County, Wolfe County,

§ 81.192 Bluegrass Intrastate Air Quality Control Region.

The Bluegrass Intrastate Air Quality Control Region (Kentucky) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Kentucky: Anderson County, Bourbon County, Boyle County, Clark County, Estill County, Fayette County, Franklin County, Garrard County, Harrison County, Jessamine County, Lincoln County, Madison County, Mercer County, Nicholas County, Powell County, Scott County, Woodford County.

§ 81.193 North Central Kentucky Intrastate Air Quality Control Region.

The North Central Kentucky Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Kentucky: Breckinridge County, Bullitt County, Grayson County, Hardin County, Henry County, Larue County, Marion County, Meade County, Nelson County, Oldham County, Shelby County, Spencer County, Trimble County, Washington County.

§ 81.194 South Central Kentucky Intrastate Air Quality Control Region.

The South Central Kentucky Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Kentucky: Adair County, Allen County, Barren County, Butler County, Casey County, Clinton County, Cumberland County, Edmonson County, Green County, Hart County, Logan County, McCreary County, Metcalf County, Monroe County, Pulaski County, Russell County, Simpson County, Taylor County, Warren County, Wayne County.

§ 81.195 Central Michigan Intrastate Air Quality Control Region.

The Central Michigan Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Michigan: Allegan County, Arenac County, Bay County, Clare County, Genesee County, Gladwin County, Gratiot County, Huron County, Ionia County, Iosco County, Isabella County, Kent County, Lake County, Lapeer County, Mason County, Mecosta County, Midland County, Montcalm County, Muskegon County, Newaygo County, Oceana County, Ogemaw County, Osceola County, Ottawa County, Roscommon County, Saginaw County, Sanilac County, Shiawassee County, Tuscola County.

§ 81.196 South Central Michigan Intrastate Air Quality Control Region.

The South Central Michigan Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the areas so delimited):

In the State of Michigan: Barry County, Branch County, Calhoun County, Clinton County, Eaton County, Hillsdale County, Ingham County, Jackson County, Kalamazoo County, Lenawee County, Livingston County, St. Joseph County, Washtenaw County.

§ 81.197 Upper Michigan Intrastate Air Quality Control Region.

The Upper Michigan Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Michigan: Alcona County, Alger County, Alpena County, Antrim County, Baraga County, Benzie County, Cheboygan County, Charlevoix County, Chippewa County, Crawford County, Delta County, Dickinson County, Emmet County, Gogebic County, Grand Traverse County, Houghton County, Iron County, Kalkaska

County, Keweenaw County, Leelanau County, Luce County, Mackinac County, Manistee County, Marquette County, Menominee County, Missaukee County, Montmorency County, Ontonagon County, Oscoda County, Otsego County, Presque Isle County, Schoolcraft County, Wexford County.

§ 81.199 East Alabama Intrastate Air Quality Control Region.

The East Alabama Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Alabama: Calhoun County, Chambers County, Cherokee County, Clay County, Cleburne County, Coosa County, Etowah County, Randolph County, Talladega County, Tallapoosa County.

§ 81.200 Metropolitan Columbus Intrastate Air Quality Control Region.

The Metropolitan Columbus Intrastate Air Quality Control Region (Ohio) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Ohio: Delaware County, Fairfield County, Franklin County, Licking County, Madison County, Perry County, Pickaway County, Union County.

§ 81.201 Mansfield-Marion Intrastate Air Quality Control Region.

The Mansfield-Marion Intrastate Air Quality Control Region (Ohio) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Ohio: Ashland County, Crawford County, Holmes County, Knox County, Marion County, Morrow County, Richland County, Wayne County, Wyandot County.

§ 81.202 Northwest Ohio Intrastate Air Quality Control Region.

The Northwest Ohio Intrastate Air Quality Control Region (Ohio) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Ohio: Allen County, Auglaize County, Champaign County, Defiance County, Fulton County, Hancock County, Hardin County, Henry County, Logan County, Mercer County, Paulding County, Putman County, Shelby County, Van Wert County, Williams County.

§ 81.203 Sandusky Intrastate Air Quality Control Region.

The Sandusky Intrastate Air Quality Control Region (Ohio) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Ohio: Erie County, Huron County, Ottawa County, Sandusky County, Seneca County.

§ 81.204 Wilmington-Chillicothe-Logan Intrastate Air Quality Control Region.

The Wilmington-Chillicothe-Logan Intrastate Air Quality Control Region (Ohio) consists of the territorial area encompassed by the boundaries of the following jurisdiction or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Ohio: Clinton County, Fayette County, Highland County, Hocking

County, Jackson County, Pike County, Ross County, Vinton County.

§ 81.205 Zanesville-Cambridge Intrastate Air Quality Control Region.

The Zanesville-Cambridge Intrastate Air Quality Control Region (Ohio) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Ohio: Carroll County, Coshocton County, Guernsey County, Harrison County, Muskingum County, Noble County, Tuscarawas County.

§ 81.213 Casper Intrastate Air Quality Control Region.

The Casper Intrastate Air Quality Control Region (Wyoming) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Wyoming: Converse County, Freemont County, Natrona County.

§ 81.214 Black Hills-Rapid City Intrastate Air Quality Control Region.

The Rapid City Intrastate Air Quality Control Region (South Dakota) has been renamed the Black Hills-Rapid City Intrastate Air Quality Control Region (South Dakota) and consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of South Dakota: Butte County, Custer County, Fall River County, Lawrence County, Meade County, Pennington County.

§ 81.215 East Central Indiana Intrastate Air Quality Control Region.

The East Central Indiana Intrastate Air Quality Control Region (Indiana) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Indiana: Blackford County, Delaware County, Grant County, Henry County, Jay County, Madison County, Randolph County, Wayne County.

§ 81.216 Northeast Indiana Intrastate Air Quality Control Region.

The Northeast Indiana Intrastate Air Quality Control Region (Indiana) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Indiana: Adams County, Allen County, De Kalb County, Huntington County, Lagrange County, Noble County, Steuben County, Wells County, Whitley County.

§ 81.217 Southern Indiana Intrastate Air Quality Control Region.

The Southern Indiana Intrastate Air Quality Control Region (Indiana) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Indiana: Bartholomew County, Brown County, Crawford County, Daviess County, Decatur County, Fayette County, Franklin County, Greene County, Harrison County, Jackson County, Jefferson County, Jennings County, Lawrence County, Martin County, Monroe County, Orange County, Owen County, Ripley

County, Rush County, Scott County, Switzerland County, Union County, Washington County.

§ 81.218 Wabash Valley Intrastate Air Quality Control Region.

The Wabash Valley Intrastate Air Quality Control Region (Indiana) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Indiana: Benton County, Carroll County, Cass County, Clay County, Clinton County, Fountain County, Fulton County, Howard County, Jasper County, Knox County, Miami County, Montgomery County, Newton County, Parke County, Pulaski County, Putnam County, Starke County, Sullivan County, Tippecanoe County, Tipton County, Vermillion County, Vigo County, Wabash County, Warren County, White County.

§ 81.219 Central Oregon Intrastate Air Quality Control Region.

The Central Oregon Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Oregon: Crook County, Deschutes County, Hood River County, Jefferson County, Klamath County, Lake County, Sherman County, Wasco County.

§ 81.220 Eastern Oregon Intrastate Air Quality Control Region.

The Eastern Oregon Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Oregon: Baker County, Gilliam County, Grant County, Harney County, Malheur County, Morrow County, Umatilla County, Union County, Wallowa County, Wheeler County.

§ 81.221 Southwest Oregon Intrastate Air Quality Control Region.

The Southwest Oregon Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Oregon: Coos County, Curry County, Douglas County, Jackson County, Josephine County.

§ 81.226 Lincoln-Beatrice-Fairbury Intrastate Air Quality Control Region.

The Lincoln-Beatrice-Fairbury Intrastate Air Quality Control Region (Nebraska) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302 (f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Nebraska: Gage County, Jefferson County, Lancaster County, Thayer County.

§ 81.230 Allegheny Intrastate Air Quality Control Region.

The Allegheny Intrastate Air Quality Control Region (West Virginia) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of West Virginia: Greenbrier County, Hampshire County, Hardy County, Monroe County, Pendleton County, Pocahontas County, Randolph County, Summers County, Tucker County.

In Grant County: Grant Magisterial District, Milroy Magisterial District.

In Mineral County: Cabin Run Magisterial District, Frankfort Magisterial District, Welton Magisterial District.

§ 81.231 Central West Virginia Intrastate Air Quality Control Region.

The Central West Virginia Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of West Virginia: Braxton County, Calhoun County, Clay County, Doddridge County, Gilmer County, Lewis County, Nicholas County, Ritchie County, Roane County, Upshur County, Webster County, Wirt County.

§ 81.232 Eastern Panhandle Intrastate Air Quality Control Region.

The Eastern Panhandle Intrastate Air Quality Control Region (West Virginia) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f) geographically located within the outermost boundaries of the area so delimited):

In the State of West Virginia: Berkeley County, Jefferson County, Morgan County.

§ 81.233 Kanawha Valley Intrastate Air Quality Control Region.

The Kanawha Valley Intrastate Air Quality Control Region (West Virginia) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of West Virginia: Kanawha County, Putnam County.

In Fayette County: Falls Magisterial District, Kanawha Magisterial District.

§ 81.234 North Central West Virginia Intrastate Air Quality Control Region.

The North Central West Virginia Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of West Virginia: Barbour County, Harrison County, Marion County, Monongalia County, Preston County, Taylor County.

§ 81.235 Southern West Virginia Intrastate Air Quality Control Region.

The Southern West Virginia Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of West Virginia: Boone County, Lincoln County, Logan County, McDowell County, Mercer County, Mingo County, Raleigh County, Wyoming County.

In Fayette County: Fayetteville Magisterial District, Mountain Cove Magisterial District, Nuttall Magisterial District, Quinnimont Magisterial District, Sewell Mountain Magisterial District.

§ 81.236 Central Georgia Intrastate Air Quality Control Region.

The Central Georgia Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Georgia: Baldwin County, Ben Hill County, Bibb County, Bleckley County, Crawford County, Dodge County, Hancock County, Houston County, Jasper County, Jeff Davis County, Johnson

County, Jones County, Laurens County, Macon County, Monroe County, Montgomery County, Peach County, Pulaski County, Putnam County, Telfair County, Toombs County, Treutlen County, Twiggs County, Washington County, Wheeler County, Wilcox County, Wilkinson County.

§ 81.237 Northeast Georgia Intrastate Air Quality Control Region.

The Northeast Georgia Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Georgia: Banks County, Barrow County, Clarke County, Dawson County, Elbert County, Forsyth County, Franklin County, Greene County, Habersham County, Hall County, Hart County, Jackson County, Lumpkin County, Madison County, Morgan County, Newton County, Oconee County, Oglethorpe County, Rabun County, Stephens County, Towns County, Union County, Walton County, White County.

§ 81.238 Southwest Georgia Intrastate Air Quality Control Region.

The Southwest Georgia Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Georgia: Baker County, Berrien County, Brooks County, Calhoun County, Clay County, Colquitt County, Cook County, Crisp County, Decatur County, Dougherty County, Early County, Echols County, Grady County, Irwin County, Lanier County, Lee County, Lowndes County, Miller County, Mitchell County, Randolph County, Seminole County, Terrell County, Thomas County, Tift County, Turner County, Worth County.

§ 81.239 Upper Rio Grande Valley Intrastate Air Quality Control Region.

The Upper Rio Grande Valley Intrastate Air Quality Control Region (New Mexico) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of New Mexico: Los Alamos County, Santa Fe County, Taos County.

Those portions of Rio Arriba County lying east of the Continental Divide.

§ 81.240 Northeastern Plains Intrastate Air Quality Control Region.

The Northeastern Plains Intrastate Air Quality Control Region (New Mexico) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of New Mexico: Colfax County, Guadalupe County, Harding County, Mora County, San Miguel County, Torrance County, Union County.

§ 81.241 Southwestern Mountains-Augustine Plains Intrastate Air Quality Control Region.

The Southwestern Mountains-Augustine Plains Intrastate Air Quality Control Region (New Mexico) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of New Mexico: Catron County, Socorro County.

Those portions of McKinley County lying east of the Continental Divide.

Those portions of Valencia County, excluding the Zuni and Ramah Navajo Indian

Reservations, lying west of a line described as follows: Starting at the point at which the south boundary of Bernalillo County intersects with the section line between secs. 1 and 2 T. 7 N., R. 2 W.; thence south to the southern boundary of the Laguna Indian Reservation between secs. 35 and 36 T. 7 N., R. 2 W.; then southerly on section lines to the Socorro-Valencia County line at secs. 11, 12, 13, and 14, T. 5 N., R. 2 W.

§ 81.242 Pecos-Permian Basin Intrastate Air Quality Control Region.

The Pecos-Permian Basin Intrastate Air Quality Control Region (New Mexico) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of New Mexico: Chaves County, Curry County, De Baca County, Eddy County, Lea County, Quay County, Roosevelt County.

§ 81.243 Central Minnesota Intrastate Air Quality Control Region.

The Central Minnesota Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Minnesota: Benton County, Chisago County, Isanti County, Kanabec County, Mille Lacs County, Pine County, Sherburne County, Stearns County, Wright County.

§ 81.244 Northwest Minnesota Intrastate Air Quality Control Region.

The Northwest Minnesota Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Minnesota: Becker County, Beltrami County, Cass County, Clearwater County, Crow Wing County, Douglas County, Grant County, Hubbard County, Kittson County, Lake of the Woods County, Mahnomen County, Marshall County, Morrison County, Norman County, Otter Tail County, Pennington County, Polk County, Pope County, Red Lake County, Roseau County, Stevens County, Todd County, Traverse County, Wadena County, Wilkin County.

§ 81.245 Southwest Minnesota Intrastate Air Quality Control Region.

The Southwest Minnesota Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1875h(f) geographically located within the outermost boundaries of the area so delimited):

In the State of Minnesota: Big Stone County, Chippewa County, Cottonwood County, Jackson County, Kandiyohi County, Lac qui Parle County, Lincoln County, Lyon County, McLeod County, Meeker County, Murray County, Nobles County, Pipestone County, Redwood County, Renville County, Rock County, Swift County, Yellow Medicine County.

§ 81.246 Northern Alaska Intrastate Air Quality Control Region.

The Northern Alaska Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1875h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Alaska:

Those portions of the 1956 Election Districts 18-23, inclusive, as described in Article XIV, § 3 of the Constitution of the State of Alaska, which are not included in the designated Cook Inlet Intrastate Air Quality Control Region as designated August 12, 1970 (35 FR 12757).

§ 81.247 South Central Alaska Intrastate Air Quality Control Region.

The South Central Alaska Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Alaska:

Those portions of the 1956 Election Districts 7-17, inclusive, and Election District 24 as described in Article XIV, Section 3 of the Constitution of the State of Alaska, which are not included in the designated Cook Inlet Intrastate Air Quality Control Region as designated August 12, 1970 (35 FR 12757).

§ 81.248 Southeastern Alaska Intrastate Air Quality Control Region.

The Southeastern Alaska Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Alaska:

1956 Election Districts 1-6, inclusive, as described in Article XIV, Section 3 of the Constitution of the State of Alaska.

§ 81.249 Northwest Oregon Intrastate Air Quality Control Region.

The Northwest Oregon Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Oregon: Clatsop County, Lincoln County, Tillamook County.

§ 81.250 North Central Kansas Intrastate Air Quality Control Region.

The North Central Kansas Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Kansas: Clay County, Cloud County, Dickinson County, Ellsworth County, Geary County, Jewell County, Lincoln County, McPherson County, Mitchell County, Morris County, Ottawa County, Republic County, Rice County, Riley County, Saline County, Washington County.

§ 81.251 Northeast Kansas Intrastate Air Quality Control Region.

The Northeast Kansas Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Kansas: Atchison County, Brown County, Doniphan County, Douglas County, Franklin County, Jackson County, Jefferson County, Marshall County, Miami County, Nemaha County, Osage County, Pottawatomie County, Shawnee County, Wabaunsee County.

§ 81.252 Northwest Kansas Intrastate Air Quality Control Region.

The Northwest Kansas Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Kansas: Barton County, Cheyenne County, Decatur County, Ellis County, Gove County, Graham County,

Logan County, Ness County, Norton County, Osborne County, Phillips County, Rawlins County, Rooks County, Rush County, Russell County, Sheridan County, Sherman County, Smith County, Thomas County, Trego County, Wallace County.

§ 81.253 South Central Kansas Intrastate Air Quality Control Region.

The South Central Kansas Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Kansas: Butler County, Chase County, Cowley County, Harper County, Harvey County, Kingman County, Marion County, Reno County, Sedgwick County, Sumner County.

§ 81.254 Southeast Kansas Intrastate Air Quality Control Region.

The Southeast Kansas Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Kansas: Allen County, Anderson County, Bourbon County, Chautauqua County, Cherokee County, Coffey County, Crawford County, Elk County, Greenwood County, Labette County, Linn County, Lyon County, Montgomery County, Neosho County, Wilson County, Woodson County.

§ 81.255 Southwest Kansas Intrastate Air Quality Control Region.

The Southwest Kansas Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Kansas: Barber County, Clark County, Comanche County, Edwards County, Finney County, Ford County, Grant County, Gray County, Greeley County, Hamilton County, Haskell County, Hodgeman County, Kearny County, Kiowa County, Lane County, Meade County, Morton County, Pawnee County, Pratt County, Scott County, Seward County, Stafford County, Stanton County, Stevens County, Wichita County.

§ 81.256 Northeast Iowa Intrastate Air Quality Control Region.

The Northeast Iowa Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Iowa: Allamakee County, Benton County, Black Hawk County, Bremer County, Buchanan County, Chickasaw County, Delaware County, Fayette County, Howard County, Jones County, Linn County, Winneshiek County.

§ 81.257 North Central Iowa Intrastate Air Quality Control Region.

The North Central Iowa Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Iowa: Butler County, Cerro Gordo County, Floyd County, Franklin County, Grundy County, Hamilton County, Hancock County, Hardin County, Humboldt County, Kossuth County, Mitchell County, Webster County, Winnebago County, Worth County, Wright County.

§ 81.258 Northwest Iowa Intrastate Air Quality Control Region.

The Northwest Iowa Intrastate Air Quality Control Region consists of the territorial area encompassed by the

boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Iowa: Buena Vista County, Calhoun County, Cherokee County, Clay County, Dickinson County, Emmet County, Ida County, O'Brien County, Osceola County, Palo Alto County, Pocahontas County, Sac County.

§ 81.259 Southwest Iowa Intrastate Air Quality Control Region.

The Southwest Iowa Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Iowa: Adair County, Adams County, Audubon County, Carroll County, Cass County, Crawford County, Fremont County, Greene County, Guthrie County, Harrison County, Mills County, Monona County, Montgomery County, Page County, Ringgold County, Shelby County, Taylor County, Union County.

§ 81.260 South Central Iowa Intrastate Air Quality Control Region.

The South Central Iowa Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Iowa: Appanoose County, Boone County, Clarke County, Dallas County, Decatur County, Jasper County, Lucas County, Madison County, Mahaska County, Marion County, Marshall County, Monroe County, Polk County, Poweshiek County, Story County, Tama County, Warren County, Wayne County.

§ 81.261 Southeast Iowa Intrastate Air Quality Control Region.

The Southeast Iowa Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Iowa: Cedar County, Davis County, Henry County, Iowa County, Jefferson County, Johnson County, Keokuk County, Van Buren County, Wapello County, Washington County.

Note: For purposes of identification, the Regions are referred to by Iowa authorities as follows:

Sec.
81.256 Northeast Iowa Intrastate Air Quality Control Region: Region 1.
81.257 North Central Iowa Intrastate Air Quality Control Region: Region 2.
81.258 Northwest Iowa Intrastate Air Quality Control Region: Region 3.
81.259 Southwest Iowa Intrastate Air Quality Control Region: Region 4.
81.260 South Central Iowa Intrastate Air Quality Control Region: Region 5.
81.261 Southeast Iowa Intrastate Air Quality Control Region: Region 6.

§ 81.262 North Central Illinois Intrastate Air Quality Control Region.

The North Central Illinois Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Illinois: Bureau County, La Salle County, Lee County, Marshall County, Putnam County, Stark County.

§ 81.263 East Central Illinois Intrastate Air Quality Control Region.

The East Central Illinois Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including

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the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Illinois: Champaign County, Clark County, Coles County, Cumberland County, De Witt County, Douglas County, Edgar County, Ford County, Iroquois County, Livingston County, McLean County, Moultrie County, Piatt County, Shelby County, Vermilion County.

§ 81.264 West Central Illinois Intrastate Air Quality Control Region.

The West Central Illinois Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Illinois: Adams County, Brown County, Calhoun County, Cass County, Christian County, Greene County, Jersey County, Logan County, Macon County, Macoupin County, Menard County, Montgomery County, Morgan County, Pike County, Sangamon County, Schuyler County, Scott County.

§ 81.265 Southeast Illinois Intrastate Air Quality Control Region.

The Southeast Illinois Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Illinois: Clay County, Crawford County, Edwards County, Effingham County, Fayette County, Franklin County, Gallatin County, Hamilton County, Hardin County, Jackson County, Jasper County, Jefferson County, Lawrence County, Marion County, Perry County, Richland County, Saline County, Wabash County, Wayne County, White County, Williamson County.

§ 81.266 Alabama and Tombigbee Rivers Intrastate Air Quality Control Region.

The Alabama and Tombigbee Rivers Intrastate Air Quality Control Region (Alabama) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Alabama: Choctaw County, Clarke County, Conecuh County, Dallas County, Marengo County, Monroe County, Perry County, Washington County, Wilcox County.

§ 81.267 Southeast Alabama Intrastate Air Quality Control Region.

The Southeast Alabama Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Alabama: Barbour County, Coffee County, Covington County, Dale County, Geneva County, Henry County, Houston County.

§ 81.268 Mohave-Yuma Intrastate Air Quality Control Region.

The Mohave-Yuma Intrastate Air Quality Control Region (Arizona) has been revised to consist of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 7602 (f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Arizona: Mohave County and Yuma County.

(Secs. 107, 110 and 301(a) of the Clean Air Act, as amended (42 U.S.C. 7407, 7410 and 7601(a)))

[45 FR 7545, Feb. 4, 1980]

§ 81.269 Pima Intrastate Air Quality Control Region.

The Pima Intrastate Air Quality Control Region (Arizona) consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Arizona: Pima County.

(Secs. 107, 110, and 301(a) of the Clean Air Act, as amended(42 U.S.C. 7407, 7410, 7601(a)))

[45 FR 67347, Oct. 10, 1980]

§ 81.270 Northern Arizona Intrastate Air Quality Control Region.

The Northern Arizona Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Arizona: Apache County, Coconino County, Navajo County, Yavapai County.

(Secs. 107, 110, and 301(a) of the Clean Air Act, as amended(42 U.S.C. 7407, 7410, 7601(a)))

[45 FR 67347, Oct. 10, 1980]

§ 81.271 Central Arizona Intrastate Air Quality Control Region.

The Central Arizona Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Arizona: Gila County, Pinal County.

(Secs. 107, 110, and 301(a) of the Clean Air Act, as amended(42 U.S.C. 7407, 7410, 7601(a)))

[45 FR 67348, Oct. 10, 1980]

§ 81.272 Southeast Arizona Intrastate Air Quality Control Region.

The Southeast Arizona Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of Arizona: Cochise County, Graham County, Greenlee County, Santa Cruz County.

(Secs. 107, 110, and 301(a) of the Clean Air Act, as amended(42 U.S.C. 7407, 7410, 7601(a)))

[45 FR 67348, Oct. 10, 1980]

§ 81.273 Lake County Intrastate Air Quality Control Region.

The Lake County Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited):

In the State of California: Lake County.

[46 FR 3891, Jan. 16, 1981]

§ 81.274 Mountain Counties Intrastate Air Quality Control Region.

The Mountain Counties Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geograpically located within the outermost boundaries of the area so delimited):

In the State of California: Amador County, Calaveras County, Mariposa County, Nevada Country, Plumas County, Sierra County, Tuolumne County.

El Dorado County—all of El Dorado County except that portion within the drainage area naturally tributary to Lake Tahoe including said Lake.

Placer County—all of Placer County except the following described area:

That portion of Placer County within the drainage area naturally tributary to Lake Tahoe including said Lake, plus that area in the vicinity of the head of the Truckee River described as follows: commencing at the point common to the aforementioned drainage area crestline and the line common to Townships 15 North and 16 North, Mount Diablo Base and meridian (M.D.B.&M.), and following that line in a westerly direction to the northwest corner of Section 3, Township 15 North, Range 16 East, M.D.B.&M., thence south along the west line of Sections 3 and 10, Township 15 North, Range 16 East, M.D.B.&M., to the intersection with the said drainage area crestline, thence following the said drainage area boundary in a southeasterly, then northeasterly direction to and along the Lake Tahoe Dam, thence following the said drainage area crestline in a northeasterly, then northwesterly direction to the point of beginning.

[46 FR 3891, Jan. 16, 1981]

§ 81.275 Lake Tahoe Intrastate Air Quality Control Region.

The Lake Tahoe Intrastate Air Quality Control Region consists of the territorial area encompassed by the boundaries of the following jurisdictions or described area (including the territorial area of all municipalities (as defined in Section 302(f) of the Clean Air Act, 42 U.S.C. 1857h(f)) geographically located within the outermost boundaries of the area so delimited:

In the State of California:

El Dorado County—that portion of El Dorado County within the drainage area naturally tributary to Lake Tahoe including said Lake.

Placer County—that portion of Placer County within the drainage area naturally tributary to Lake Tahoe including said Lake, plus that area in the vicinity of the head of the Truckee River described as follows: commencing at the point common to the aforementioned drainage area crestline and the line common to Townships 15 North and 16 North, Mount Diablo Base and Meridian (M.D.B.&M.), and following that line in a westerly direction to the northwest corner of Section 3, Township 15 North, Range 16 East, M.D.B.&M., thence south along the west line of Sections 3 and 10, Township 15 North, Range 16 East, M.D.B.&M., to the intersection with the said drainage area crestline, thence following the said drainage area boundary in a southeasterly, then northeasterly direction to and along the Lake Tahoe Dam, thence following the said drainage area crestline in a northeasterly, then northwesterly direction to the point of beginning.

[46 FR 3891, Jan. 16, 1981]

Subpart C—Section 107 Attainment Status Designations

AUTHORITY: Secs. 107, 301 of the Clean Air Act, as amended (42 U.S.C. 7407, 7601).

SOURCE: 43 FR 8964, Mar. 3, 1978, unless otherwise noted.

§ 81.300 Scope.

Attainment status designations as approved or designated by the Environmental Protection Agency (EPA) pursuant to Section 107 of the Act are listed in this subpart. Area designations are subject to revision whenever sufficient data becomes available to warrant a redesignation. Both the State and EPA can initiate changes to these designations, but any State redesignation must be submitted to EPA for concurrence.

§ 81.301 Alabama.

Alabama—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
That portion of Etowah City within the western section of Gadsden	x	x		
Those portions of Jefferson City within central Birmingham and the area surrounding the Universal Atlas Cement plant	x	x		
Fairfield Area of Jefferson City		x		

Alabama—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Bessemer and Irondale areas of Jefferson County[1]			X	
That portion of Mobile City within a section of downtown Mobile	X	X		
Rest of State				X

[1] See FEDERAL REGISTER of June 21, 1981.

Alabama—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
That portion of Colbert County surrounding TVA's Colbert Plant		X		
That portion of Jackson County surrounding TVA's Widow Creek Plant	X			
That portion of Lauderdale County adjacent to TVA's Colbert Plant		X		
Rest of State				X

Alabama—O_3

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Jefferson County	X	
Mobile County	X	
Russel County	[1]X	
Rest of State		X

[1] EPA designation replaces State designation.

Alabama—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Statewide		X

Alabama—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Statewide		X

(Secs. 107, 171, 172, 301 of the Clean Air Act (42 U.S.C. 7407, 7501, 7601))

[43 FR 8964, Mar. 3, 1978, as amended at 43 FR 40421, Sept. 11, 1978; 44 FR 41782, July 18, 1979; 45 FR 39257, June 10, 1980; 46 FR 32583, June 24, 1981; 46 FR 46930, Sept. 23, 1981; 46 FR 53415, Oct. 29, 1981]

§ 81.302 Alaska.

Alaska—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Entire State				X

Alaska—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Entire State				X

Alaska—O_x

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Entire State		X

Alaska—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Anchorage	X	
Fairbanks	X	
Remainder of State		X

Alaska—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Entire State		X

§ 81.303 Arizona.

Arizona—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Ajo:				
T12S, R6W	[1]X			
Douglas:				
T24S, R27E	[1]X			
T24S, R26E	[1]X			
Hayden:				
T5S, R15E	[1]X			
Joseph City:				
T18N, R19E	[1]X			
Miami:				
T1N, R15E	[1]X			
Page:				
T41N, R9E	[1]X			
Paul Spur:				
T24S, R26E	[1]X			
Phoenix: That portion of Maricopa County known as the Maricopa Association of Governments (MAG) Urban Planning Area	[1]X			
Tucson: That portion within Pima County of the area described by connecting the following geographical coordinates moving in a clockwise manner:				
LAT(N) and LON(W):				
32°38.5' 111°24.0'				
32°26.5' 110°47.5'				
32°12.5' 110°32.5'				
31°49.5' 110°25.5'				
31°42.0' 110°50.5'				
31°52.5' 111°12.5'				
32°24.5' 111°29.0'	[1]X			
San Manuel:				
T10S, R17E			[1]X	
T10S, R16E			[1]X	
Morenci: T4S, R29E	[1]X			
Rest of State				[1]X

[1]EPA designation replaces State designation.

Arizona—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Ajo:				
T11S, R6W	X			
T11S, R5W	X			
T12S, R6W	X			
T12S, R5W	X			
T13S, R6W	X			
T11S, R7W			X	
T12S, R7W			X	

Arizona—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
T13S, R7W			X	
T13S, R5W			X	
Douglas:				
T23S, R27E	X			
T24S, R27E	X			
T24S, R28E	X			
T23S, R26E			X	
T23S, R28E			X	
T24S, R26E			X	
Hayden:				
T4S, R14E	X			
T4S, R15E	X			
T4S, R16E	X			
T5S, T14E	X			
T5S, R15E	X			
T5S, R16E	X			
T6S, R14E	X			
T6S, R15E	X			
T6S, R16E	X			
T4S, R13E			X	
T4S, R17E			X	
T5S, R13E			X	
T5S, R17E			X	
T6S, R13E			X	
T6S, R17E			X	
Miami:				
T2N, R14E	X			
T2N, R15E	X			
T1N, R13E [1]	X			
T1N, R14E	X			
T1N, R15E	X			
T1N, R16E	X			
T1S, R14E [1]	X			
T1S, R14½E	X			
T1S, R15E	X			
T2N, R13E [1]			X	
T2N, R16E			X	
T1S, R13E [1]			X	
T1S, R16E			X	
T2S, R14E [1]			X	
T2S, R15E			X	
Morenci:				
T3S, R28E [2]	X			
T3S, R29E	X			
T3S, R30E	X			
T4S, R28E [2]	X			
T4S, R29E	X			
T4S, R30E	X			
T5S, R28E [2]	X			
T5S, R29E [2]	X			
T5S, R30E			X	
San Manuel:				
T8S, R16E	X			
T8S, R17E	X			
T8S, R18E	X			
T9S, R15E	X			
T9S, R16E	X			
T9S, R17E	X			
T9S, R18E	X			
T10S, R15E	X			
T10S, R16E	X			
T10S, R17E	X			
T11S, R16E	X			
T10S, R18E			X	
T11S, R17E			X	
T12S, R16E			X	
T12S, R17E			X	

Arizona—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Page:				
T41N, R9E			[3]X	
Rest of State				X

[1]Only that portion in Gila County.
[2]Only that portion in Greenlee County.
[3]EPA designation replaces State designation.

Arizona—O,

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Maricopa Association of Governments Urban Planning Area	X	
Tucson Area		X
Rest of State		X

Arizona—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Maricopa Association of Governments Urban Planning Area	X	
Tucson Area	X	
Rest of State		X

Arizona—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Whole State		X

[43 FR 8964, Mar. 3, 1978, as amended at 44 FR 16392, Mar. 19, 1979; 44 FR 21263, Apr. 10, 1979; 44 FR 53083, Sept. 12, 1979; 44 FR 54295, Sept. 19, 1979]

§ 81.304 Arkansas.

Arkansas—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
AQCR 016				X
AQCR 017				X
AQCR 018				X
AQCR 019				X
AQCR 020				X

Arkansas—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
AQCR 021				X
AQCR 022				X

Arkansas—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
AQCR 016				X
AQCR 017				X
AQCR 018				X
AQCR 019				X
AQCR 020				X
AQCR 021				X
AQCR 022				X

Arkansas—O_x

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 016		
Pulaski County	X	
Remainder of AQCR		X
AQCR 017		X
AQCR 018		X
AQCR 019		X
AQCR 020		X
AQCR 021		X
AQCR 022		X

Arkansas—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 016		X
AQCR 017		X
AQCR 018		X
AQCR 019		X
AQCR 020		X
AQCR 021		X
AQCR 022		X

Arkansas—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 016		X
AQCR 017		X
AQCR 018		X
AQCR 019		X
AQCR 020		X
AQCR 021		X
AQCR 022		X

[43 FR 8964, Mar. 3, 1978, as amended at 43 FR 40421, Sept. 11, 1978]

§ 81.305 California.

California—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
North Coast Air Basin:				
Del Norte County				X
Humboldt County				X
Mendocino County				X
Sonoma County (North Coast Air Basin portion)				X
Trinity County				X
Lake County Air Basin				X
North Central Coast Air Basin				X
South Central Coast Air Basin:				
San Luis Obispo County:				
Salinas Valley-El Pomar Estrella Planning Area		X		
Non-Salinas Valley				X
Santa Barbara County (AQMA portion)				X
Santa Barbara County (Non-AQMA portion):				
A. West area of north-south boundary separating Santa Ynez and Lompoc Valleys	X			
B. East area of north-south boundary separating Santa Ynez and Lompoc Valleys			X	
Ventura County:				
North of Los Padres National Forest southern boundary				X
South of Los Padres National Forest southern boundary	X			
Channel Islands			X	
San Diego Air Basin:				
San Diego County (West portion)	X			
San Diego County (East portion)			X	
South Coast Air Basin	X			
San Joaquin Valley Air Basin	X			
Sacramento Valley Air Basin (SVAB):				
Sacramento County		X		
Solano County (SVAB Portion)			X	
Yolo County			X	
Butte County			X	
Colusa County			X	
Glenn County			X	
Shasta County (SVAB Portion)			X	
Sutter County			X	
Tehama County			X	
Yuba County			X	
Great Basin Valleys Air Basin			X	
Northeast Plateau Air Basin			X	
Southeast Desert Air Basin:				
Kern County (S.E. Desert Air Basin Portion)			X	
Imperial County			X	
Los Angeles County (S.E. Desert Air Basin Portion):				
Lancaster Quartz Hill Area	X			

California—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Non-Lancaster Quartz Hill Area			X	
Riverside County (S.E. Desert AQMA Portion)			X	
San Bernardino County (S.E. Desert AQMA Portion):				
Victorville Area	X			
Non-Victorville Area			X	
Riverside County (non-AQMA Portion)			X	
San Bernardino County (non-AQMA Portion)			X	
Lake Tahoe Air Basin				X
San Francisco Bay Area Air Basin:				
Solano County (S.F. Bay Area Air Basin portion)				X
San Mateo County				X
Marin County				X
Napa County				X
Sonoma County (S.F. Bay Area Air Basin portion)				X
Alameda County				X
Contra Costa County				X
San Francisco County				X
Santa Clara County		X		
Rest of Air Basin		X		
Mountain Counties Air Basin:				
Placer County (AQMA portion)				X
Placer County (excluding AQMA portion and Lake Tahoe portion)				X
Amador County				X
Calaveras County			X	
El Dorado County (excluding Lake Tahoe Air Basin portion)				X
Mariposa County			X	
Nevada County			X	
Plumas County				X
Sierra County				X
Tuolumne County			X	

California—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
North Coast Air Basin:				
Del Norte County			X	
Humboldt County			X	
Mendocino County			X	
Sonoma County (North Coast Basin portion)			X	
Trinity County			X	
Lake County Air Basin			X	
San Francisco Bay Area Air Basin				X
North Central Coast Air Basin:				
Monterey County			X	
San Benito County			X	
Santa Cruz County			X	
South Central Coast Air Basin:				
San Luis Obispo County			X	
Santa Barbara County (AQMA portion)			X	
Santa Barbara County (non-AQMA portion)			X	
Ventura County				X
Channel Islands			X	
San Diego Air Basin:				
San Diego County (West portion)				X
San Diego County (East portion)				X
South Coast Air Basin:				
Los Angeles County (South Coast Air Basin portion)				X
Orange County				X
Riverside County (South Coast Air Basin portion)				X
South Coast Basin portion of San Bernardino County				

California—SO_x

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
San Joaquin Valley Air Basin:				
Fresno County			X	
Kern County	X			
Kings County			X	
Madera County			X	
Merced County			X	
San Joaquin County			X	
Stanislaus County			X	
Tulare County			X	
Sacramento Valley Air Basin			X	
Great Basin Valley's Air Basin			X	
North East Plateau Air Basin			X	
Mountain Counties Air Basin			X	
Southeast Desert Air Basin excluding Imperial Co			X	
Imperial County				X
Lake Tahoe Air Basin				X

California—Ozone

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
North Coast Air Basin		X
San Francisco Bay Area Air Basin	X	
Lake County Air Basin		X
North Central Coast Air Basin	X	
South Central Coast Air Basin:		
Ventura County:		
North of Los Padres National Forest southern boundary		X
South of Los Padres National Forest southern boundary	X	
San Luis Obispo County		X
Santa Barbara County AQMA	X	
Santa Barbara County non-AQMA	X	
Channel Islands		X
San Diego Air Basin:		
San Diego Intrastate AQCR Portion	X	
Southeast Desert Intrastate AQCR Portion	X	
South Coast Air Basin	X	
San Joaquin Valley Air Basin	X	
Sacramento Valley Air Basin (SVAB):		
Sacramento Valley Area AQMA (SVAB Portion)	X	
Butte County	X	
Colusa County		X
Glenn County		X
Shasta County (SVAB Portion)		X
Sutter County	X	
Tehama County		X
Yuba County	X	
Great Basin Valleys Air Basin		X
Northeast Plateau Air Basin		X
Mountain Counties Air Basin (MCAB):		
Amador County		X
Calaveras County		X
El Dorado County (MCAB Portion)	X	
Mariposa County		X
Nevada County		X
Placer County (AQMA Portion)	X	
Placer County (MCAB non-AQMA Portion)	X	
Plumas County		X
Sierra County		X
Tuolumne County		X

California—Ozone

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Southeast Desert Air Basin (SEDAB):		
Imperial County	X	
Kern County (SEDAB Portion)		X
Los Angeles County (SEDAB Portion)	X	
Riverside County (S.E. Desert AQMA Portion)	X	
Riverside County (SEDAB non-AQMA Portion)		X
San Bernardino County (S.E. Desert AQMA Portion)	X	
San Bernardino County (SEDAB non-AQMA Portion)		X
Lake Tahoe Air Basin		X

California—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
North Coast Air Basin		X
San Francisco Bay Area Air Basin	X	
Lake County Air Basin		X
North Central Coast Air Basin:		
Monterey County		X
San Benito County		X
Santa Cruz County		X
South Central Coast Air Basin:		
San Luis Obispo County		X
Santa Barbara AQMA	X	
Santa Barbara non-AQMA		X
Ventura County		X
Channel Islands		X
San Diego Air Basin:		
West San Diego County	X	
East San Diego County		X
South Coast Air Basin	X	
San Joaquin Valley Air Basin (SJVAB):		
Fresno County (within Fresno-Clovis Metropolitan Area [1])	X	
Fresno County (outside Fresno-Clovis Metropolitan Area [1])		X
Kern County (SJVAB: within Bakersfield Metropolitan Area)	X	
Kern County (SJVAB: outside Bakersfield Metropolitan Area)		X
Kings County		X
Madera County		X
Merced County		X
San Joaquin County	X	
Stanislaus County	X	
Tulare County		X
Sacramento Valley Air Basin (SVAB):		
Butte County	X	
Colusa County		X
Glenn County		X
Sacramento County:		
Sacramento Area	X	
Non-Sacramento Area		X
Shasta County (SVAB Portion)		X
Solano County (SVAB Portion)		X
Sutter County		X
Tehama County		X
Yolo County		X
Yuba County		X
Great Basin Valley Air Basin		X
Northeast Plateau Air Basin		X
Mountain Counties Air Basin:		
AQMA portion of Placer County		X
Placer County excluding AQMA portion and Lake Tahoe portion		X

California—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Amador County		X
Calaveras County		X
El Dorado County, excluding Lake Tahoe Air Basin portion		X
Mariposa County		X
Nevada County		X
Plumas County		X
Sierra County		X
Tuolumne County		X
Southeast Desert Air Basin (SEDAB)		
Imperial County		X
Kern County (SEDAB Portion)		X
Los Angeles County (SEDAB Portion)		X
Riverside County (S.E. Desert AQMA Portion)		X
Riverside County (SEDAB non-AQMA Portion)		X
San Bernardino County (S.E. Desert AQMA Portion)		X
San Bernardino County (SEDAB non-AQMA Portion)		X
Lake Tahoe Air Basin	X	

[1] As shown on page 4 of the *1974 General Plan Report for the FCMA*, City of Fresno Department of Planning and Inspection.

California—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
North Coast Air Basin		X
San Francisco Area Air Basin		X
Lake County Air Basin		X
North Central Coast Air Basin:		
Monterey portion		X
San Benito portion		X
Santa Cruz portion		X
South Central Coast Air Basin:		
San Luis Obispo Count		X
Santa Barbara AQMA		X
Santa Barbara non-AQMA		X
Ventura County		X
Channel Islands		X
San Diego Air Basin:		
West San Diego County		X
East San Diego County		X
South Coast Air Basin	X	
San Joaquin Valley Air Basin:		
Fresno County		X
Kern County (SJVAS portion)		X
Kings County		X
Madera County		X
Merced County		X
San Joaquin County		X
Stanislaus County		X
Tulare County		X
Sacramento Valley Air Basin:		
Sacramento County		X
Solano County (Sacramento Valley Air Basin portion)		X
Yolo County		X
Butte County		X
Colusa County		X
Glenn County		X
Shasta County (Sacramento Valley portion)		X
Sutter County		X
Tehama County		X
Yuba County		X

California—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Great Basin Valleys Air Basin		X
Northeast Plateau Air Basin		X
Mountain Counties Air Basin:		
AQMA portion of Placer Co. County		X
Placer County excluding AQMA portion and Lake Tahoe portion		X
Amador County		X
Calaveras County		X
El Dorado County, excluding Lake Tahoe Air Basin portion		X
Mariposa County		X
Nevada County		X
Plumas County		X
Sierra County		X
Tuolumne County		X
Southeast Desert Air Basin County:		
Kern County (S.E. Desert portion) County		X
Imperial County		X
Los Angeles County (portion within S.E. Desert Air Basin)		X
Riverside County (portion within S.E. Desert AQMA) County		X
San Bernardino County (portion within S.E. Desert AQMA)		X
Riverside County, non-AQMA portion County		X
San Bernardino, non-AQMA		X
Tahoe Air Basin		X

(Secs. 107(d) and 301(a) of the Clean Air Act, as amended (42 U.S.C. 7407(d) and 7801(a)))

[43 FR 8964, Mar. 3, 1978, as amended at 44 FR 16392, Mar. 19, 1979; 44 FR 53082, Sept. 12, 1979; 44 FR 65751, Nov. 15, 1979; 44 FR 65987, Nov. 16, 1979; 44 FR 76787, Dec. 28, 1979; 45 FR 46807, July 11, 1980; 45 FR 53148, Aug. 11, 1980; 45 FR 59315, Sept. 9, 1980; 46 FR 14892, Mar. 3, 1981; 46 FR 37897, July 23, 1981; 47 FR 3354, Jan. 25, 1982; 47 FR 28102, June 29, 1982]

EFFECTIVE DATE NOTE: At 47 FR 28102, June 29, 1982, amendments were made to the tables for California TSP, Ozone, and CO, effective July 29, 1982. For the convenience of the user, the superseded text appears below.

§ 81.305 California.

California—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
North Coast Air Basin:				
• • • •	•		•	•
Mendocino County	X			
• • • •	•		•	•
South Central Coast Air Basin:				
• • • •	•		•	•
Ventura County:				
North of Los Padres Nat'l Forest boundaries			X	
South of Los Padres Nat'l Forest boundaries	X			
• • • •	•		•	•
Southeast Desert Air Basin:				
• • • •	•		•	•
Los Angeles County (S.E. Desert Air Basin Portion)	X			
Riverside County (S.E. Desert AQMA Portion)	X			
San Bernardino County (S.E. Desert AQMA Portion)	X			

California—Ozone

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
South Central Coast Air Basin		
Ventura County	X	

California—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Sacramento Valley Air Basin (SVAB)		
Sacramento County	X	

§ 81.306 Colorado.

Colorado—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
AQCR 1				X
AQCR 2—Cities of Fort Collins and Greeley		X		
Remainder of AQCR 2				X
AQCR 3—Denver Designated Area	X			
City Limits of Castle Rock			X	
Remainder of AQCR 3				X
AQCR 4—Colorado Springs 3-C Urbanized Area	X			
Remainder of AQCR 4				X
AQCR 5				X
AQCR 6—City Limits of Lamar			X	
Remainder of AQCR 6				X
AQCR 7				
Pueblo 3-C urbanized area except "core area" [1]				X
Pueblo "core area" [2]	X	X		
Remainder of AQCR 7				X
AQCR 8				X
AQCR 9—City Limits of Tallunde and Pagosa Springs			X	
Remainder of AQCR 9				X
AQCR 10—City Limits of Delta			X	

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Colorado—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Remainder of AQCR 10			X	
AQCR 11—Mesa Designated Area	X			
Remainder of AQCR 11 including the City of Craig			X	
AQCR 12—City limits of Aspen, Eagle, Vail, and Steamboat Springs			X	
Remainder of AQCR 12				X
AQCR 13				X

[1] For a description of the core area, see 47 FR 2131, Jan. 14, 1982.
[2] Designation of "core area" is based on actions published at 43 FR 8964 (Mar. 3, 1970) and 43 FR 4022 (Sept. 11, 1978).

Colorado—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Entire State				X

Colorado—O_3

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 1		X
AQCR 2—[1]		X
AQCR 3—Counties of Boulder, Denver, Jefferson, and Douglas; Western portions of Adams and Arapahoe Counties	X	
Remainder of AQCR 3		X
AQCR 4—El Paso County		X
Remainder of AQCR 4		X
AQCR's—5-13		X

Colorado—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 1		X
AQCR 2—Ft. Collins and Greeley AQMA Analysis Areas	X	
Remainder of AQCR 2		X
AQCR 3—Counties of Denver, Jefferson, Boulder, and Douglas; Western portions of Adams and Arapahoe Counties	X	
Remainder of AQCR 3	X	
AQCR 4—Colorado Springs 3-C Urbanized Area	X	
Reminder of AQCR 4	X	
AQCR's 5-13		X

Colorado—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR's 1-2		X
AQCR 3—Denver 3-C Urbanized Area	X	
Remainder of AQCR 3		X
AQCR 4		X

[43 FR 8964, Mar. 3, 1978, as amended at 43 FR 40422, Sept. 11, 1978; 44 FR 64078, Nov. 6, 1979; 44 FR 67380, Nov. 26, 1979; 47 FR 1378, Jan. 13, 1982; 47 FR 2114, Jan. 14, 1982]

§ 81.307 Connecticut.

Connecticut—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
AQCR 41		X		
AQCR 42		X		
Waterbury	X	X		
Remainder of AQCR		X		
AQCR 43		X		
Greenwich	X	X		
Remainder of AQCR		X		
AQCR 44		X		

Connecticut—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
AQCR 41				X
AQCR 42				X
AQCR 43				X
AQCR 44				X

Connecticut—O_3

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 41	X	
AQCR 42	X	
AQCR 43	X	
AQCR 44	X	

Connecticut—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 41		X
AQCR 42	X	
AQCR 43	X	
AQCR 44		X

Connecticut—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 41		X
AQCR 42		X
AQCR 43		X
AQCR 44		X

(Secs. 110, 172, and 301 of the Clean Air Act, as amended)

[43 FR 8964, Mar. 3, 1978, as amended at 43 FR 40423, Sept. 11, 1978; 45 FR 84788, Dec. 23, 1980]

§ 81.308 Delaware.

Delaware—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
City of Wilmington			X	
Section within City of Newark bounded by: College Avenue, CONRAIL tracks, South Chapel Street and Chestnut Hill Road			X	
Remainder of New Castle County				X
Kent County				X
Sussex County				X

Delaware—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
New Castle County				X
Kent County				X
Sussex County				X

Delaware—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
New Castle County		X
Kent County		X
Sussex County		X

Delaware—O_x

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
New Castle County	X	
Kent County		X
Sussex County		X

Delaware—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
New Castle County		X
Kent County		X
Sussex County		X

[43 FR 40505, Sept. 12, 1978]

§ 81.309 District of Columbia.

District of Columbia—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
1 Area bounded by East Capitol Street S.E., District Line (Southern Avenue S.E.), Eastern Shore of Potomac River and Eastern Shore of Anacostia River				X
2 Area bounded by Francis Scott Key Bridge, M Street, N.W., 23rd Street N.W., Florida Avenue N.W., U Street N.W., Florida Avenue N.W.-N.E., 4th Street N.E.-S.E. Southeast-Southwest Freeway (I295, I395), 15th Street S.W.-N.W., Constitution Avenue N.W., Theodore Roosevelt Memorial Bridge, Potomac River				X
3 Remainder of the District of Columbia portion of the National Capital Interstate AQCR				X

District of Columbia—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
National Capital Interstate AQCR—District of Columbia portion				X

District of Columbia—O_3

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
National Capital Interstate AQCR—District of Columbia portion	X	

District of Columbia—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
National Capital Interstate AQCR—District of Columbia portion	X	

District of Columbia—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
National Capital Interstate AQCR—District of Columbia portion		X

(Secs. 107(d), 171(2), 301(a), of the Clean Air Act as amended (42 U.S.C. 7407(d), 7501(2), 7601(a)))

[43 FR 40507, Sept. 12, 1978, as amended at 46 FR 48929, Oct. 5, 1981]

§ 81.310 Florida.

Florida—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
The downtown Jacksonville area located just north and west of the St. Johns River and east of I-95		[1]X		
Seminole County			[1]X	
Polk County			[1]X	
That portion of Hillsborough County which falls within the area of the circle having a centerpoint at the intersection of US 41 and State Road 60 and a radius of 12 km		[1]X		
Rest of State				[1]X

[1] EPA designation only

Florida—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Duval County			[1]X	
The Northwest Corner of Pinellas County	[1]X	[1]X		
The Southwest Corner of Pasco County			[1]X	
Hillsborough County			[1]X	
Escambia County			[1]X	
Rest of State				[1]X

[1] EPA designation only

Florida—O$_3$

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Broward County	[1]X	
Dade County	[1]X	
Duval County	[1]X	
Hillsborough County	[1]X	
Orange County	[1]X	
Palm Beach County	[1]X	
Pinellas County	[1]X	
Rest of State		[1]X

[1] EPA designation only

Florida—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Rest of State		[1]X

[1] EPA designation only

Florida—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Statewide		[1]X

[1] EPA designation only

(Secs. 107, 171, and 301 of the Clean Air Act (42 U.S.C. 7407, 7501, and 7601))

[43 FR 8964, Mar. 3, 1978, as amended at 43 FR 40423, Sept. 11, 1978; 44 FR 24846, Apr. 27, 1979; 44 FR 63105, Nov. 2, 1979]

§ 81.311 Georgia.

Georgia—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
That portion of Chatham County within 0.25 mile of the West Lathrop and Augusta monitoring site in Savannah*			X	
That portion of the northern part of Walker County which includes Rossville	X	X		
Rest of State				X

*See Federal Register of September 23, 1981.

Georgia—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Statewide				X

Georgia—O_x

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Atlanta Area—Clayton, Cobb, Coweta, DeKalb, Douglas, Fayette, Fulton, Gwinnett, Henry, Spaulding and Rockdale Counties	X	
Muscogee County	[1]X	
Rest of State		X

[1] EPA designation replaces State designation.

Georgia—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Atlanta Area—those portions of Clayton, DeKalb, and Fulton Counties within perimeter highway I-285	X	
Rest of State		X

Georgia—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Statewide		X

(Secs. 107, 171, 301, Clean Air Act (42 U.S.C. 7407, 7501, 7801))

[43 FR 8964, Mar. 3, 1978, as amended at 43 FR 40424, Sept. 11, 1978; 44 FR 70143, Dec. 6, 1979; 46 FR 46930, Sept. 23, 1981; 46 FR 53415, Oct. 29, 1981]

§ 81.312 Hawaii.

Hawaii—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Maui Island within 2 km radius of power plant at Kahului	[1]X			
Hawaii Island			[1]X	
Rest of State				X

[1]EPA designation replaces State designation.

Hawaii—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Maui Island within 2 km radius of power plant at Kahului	[1]X			
Oahu Island, within 2 km radius of power plant at Kahe Point	[1]X			
Rest of State				X

[1]EPA designation replaces State designation.

Hawaii—O_x

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Whole State		X

Hawaii—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Whole State		X

Hawaii—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Whole State		X

(Secs. 107(d), 171(2), 301(a) of the Clean Air Act, as amended (42 U.S.C. 7407(d), 7501(2), 7601(a)))

[43 FR 8964, Mar. 3, 1978, as amended at 44 FR 53084, Sept. 12, 1979]

§ 81.313 Idaho.

Idaho—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Silver Valley (in Shoshone County)	X			
Pocatello	X			
Soda Springs	X			
Lewiston	X			
Remainder of State				X

Idaho—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Silver Valley (Shoshone County)	X			
Pocatello	X			
Remainder of State				X

Idaho—O_3

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Entire State		X

Idaho—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Boise	X	
Remainder of State		X

Idaho—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Entire State		X

§ 81.314 Illinois

Illinois—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
AQCR 65				
Knox County				
Galesburg	X	X		
Henderson	X	X		
All other twps		X		
Peoria County				
Peoria	X	X		
Limestone	X	X		
Richwoods	X	X		
All other twps		X		
Tazewell County				
Cincinnati	X	X		
Elm Grove	X	X		
Fondulac	X	X		
Groveland	X	X		
Pekin	X	X		
Washington	X	X		
All other twps		X		
Woodford				
El Paso				X
Kansas				X
All other twps		X		
Fulton County				X
Hancock				X
Henderson				X
Mason				X
McDonough				X
Warren				X
AQCR 66				
McLean County				
Bloomington		X		
Normal		X		
All other twps				X
Coles County				X
Vermilion				X
Champaign				X
Clark				X
Cumberland				X
De Witt				X
Douglas				X
Edgar				X
Ford				X
Iroquois				X
Livingston				X
Moultrie				X
Piatt				X
Shelby				X
AQCR 67				
Cook County				
Hyde Park	X	X		
Jefferson	X	X		
Lake	X	X		

Illinois—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Lakeview	X	X		
North Town	X	X		
Rogers Park	X	X		
South Town	X	X		
West Town	X	X		
Berwyn	X	X		
Calument	X	X		
Cicero	X	X		
Lyons	X	X		
Oak Park	X	X		
Palos	X	X		
Proviso	X	X		
Riverside	X	X		
South Stickney	X	X		
Stickney	X	X		
Thorton	X	X		
Worth	X	X		
Schaumburg				X
Barrington				X
New Trier				X
All other twps		X		
Du Page County:				
Addison	X	X		
Lisle	X	X		
York	X	X		
All other twps	X	X		
Kankakee County:				
Essex				X
Norton				X
Pilot				X
All other twps		X		
Kendall County:				
All twps		X		
Lake County:				
All twps		X		
Will County:				
Chanahon		X		
Crete	X	X		
Du Page	X	X		
Florence		X		
Frankfort		X		
Green Garden		X		
Homer		X		
Jackson		X		
Joliet	X	X		
Lockport	X	X		
Manhattan		X		
Monee		X		
New Lenox		X		
Peotone		X		
Plainfield		X		
Troy	X	X		
Wheatland		X		
Wilton		X		
All other twps				X
Grundy County:				
Aux Sable Twp			X	
Morris Twp			X	
All other twps				X
Kane County:				
Aurora		X		
Dundee		X		
Elgin		X		
All other twps				X
McHenry County				X

Illinois—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
AQCR 68				
Jo Daviess County				
Apply River	X	X		
Council Hill	X	X		
Derinda		X		
East Galena	X	X		
Elizabeth	X	X		
Guilford	X	X		
Hanover		X		
Menominee		X		
Pleasant Valley		X		
Rawlins	X	X		
Rice	X	X		
Rush		X		
Scales Mound	X	X		
Stockton		X		
Thompson	X	X		
Vinegar Hill		X		
Warren		X		
West Galena	X	X		
Woodbine	X	X		
All other twps				X
AQCR 69				
Henry County				X
Rock Island County:				
Blackhawk	X	X		
Hampton	X	X		
Moline	X	X		
Rock Island	X	X		
South Moline	X	X		
South Rock Island	X	X		
All other twps				X
Whiteside County:				
Clyde		X		
Coloma		X		
Genesse		X		
Hopkins		X		
Hume		X		
Jordan		X		
Lyndon		X		
Montomorency		X		
Mount Pleasant		X		
Prophetsown		X		
Sterling		X		
All other twps				X
Carroll County				X
Mercer				X
AQCR 70				
Monroe County:				
T 1 N–R 10W	X	X		
T 1 N–R 11W	X	X		
T 1 S–R 10W	X	X		
T 1 S–R 11W	X	X		
T 2 S–R 10W	X	X		
T 2 S–R 9W	X	X		
T 3 S–R 7W	X	X		
T 3 S–R 8W	X	X		
All other twps		X		
Madison County:				
Chouteau		X		
Godfrey		X		
All other twps	X	X		
St Clair County:				
All other twps	X	X		
Bond County				X
Clinton				X
Randolph				X

Illinois—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Washington				X
AQCR 71:				
Bureau County:				
Berlin		X		
Bureau		X		
Concord		X		
Dover		X		
Greenville		X		
Lamoille		X		
Lee				X
Manlius		X		
Ohio		X		
Princeton		X		
Selby		X		
Walnut		X		
Wyanet		X		
All other twps				X
LaSalle County:				
Deer Park		X		
Dimmick		X		
LaSalle	X	X		
Ottawa		X		
Peru		X		
Utica		X		
Waltham		X		
All other twps				X
Lee County				X
Putnam County:				
Hennepin Twp		X		
All other twps				X
Marshall County				X
Stark County				X
AQCR 72:				
Massac County:				
T.15S.-R.4E		X		
T.16S.-R.4E		X		
All other twps				X
Pope County:				
All twps				X
Alexander County				X
Johnson County				X
Pulaski County				X
Union County				X
AQCR 73:				
DeKalb County:				
Alton		X		
Clinton		X		
Cortland		X		
DeKalb		X		
Malta		X		
Mayfield		X		
Milan		X		
Paw Paw		X		
Pierce		X		
Shabbona		X		
Somonauk		X		
South Grove		X		
Squaw Grove		X		
Sycamore		X		
Victor		X		
All other twps				X
Stephenson County				X
Winnebago County:				
Rockford		X		
All other twps				X
Boone County				X
Ogle				X

Illinois—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
AQCR 74				
Jefferson County		X		
Dodds		X		
Field		X		
McClellan		X		
Mount Vernon		X		
Rome		X		
Shiloh				X
All other twps				
Williamson County		X		
West Marion				X
All other twps				X
Clay County				X
Crawford				X
Edwards				X
Effingham				X
Fayette				X
Franklin				X
Gallatin				X
Hamilton				X
Hardin				X
Jackson				X
Jasper				X
Lawrence				X
Marion				X
Perry				X
Richland				X
Saline				X
Wabash				X
Wayne				X
White				
AQCR 75				
Adams County		X		
Ellington Twp		X		
Melrose		X		
Riverside				X
All other twps				
Macon County	X	X		
Decatur		X		
Hickory Point				X
All other twps				
Menard County		X		
Petersburg East Twp		X		
Petersburg North		X		
Petersburg South				X
All other twps				
Sagamon County			X	
All townships				X
Brown County				X
Calhoun				X
Cass				X
Christian				X
Greene				X
Jersey				X
Logan				X
Marcoupin				X
Montgomery				X
Morgan				X
Pike				X
Schuyler				X
Scott				X

Illinois—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
AQCR 65				
Peoria County				
Hollis Twp	X	X		
Limestone	X	X		
Logan	X			
Medina				X
Peoria	X			
Kickapoo				X
Richwoods				X
All other twps				X
Tazewell County				
Cincinnati Twp	X	X		
Elmgrove		X		
Groveland	X			
Pekin	X			
All other twps				X
Fulton County				X
Hancock County				X
Henderson County				X
Knox County				X
McDonough County				X
Mason County				X
Warren County				X
Woodford County				X
Lee County				X
AQCR 66				
Champaign County				X
Clark County				X
Coles County				X
Cumberland County				X
De Witt County				X
Douglas County				X
Edgar County				X
Ford County				X
Iroquois County				X
Livingston County				X
McLean County				X
Moultrie County				X
Piatt County				X
Shelby County				X
Vermilion County				X
AQCR 67				
Cook County				
Bremer Twp			X	
Calumet Twp			X	
Thornton Twp			X	
Worth Twp			X	
All other Cook County twps				X
Will County				
Channahon Twp			X	
Du Page Twp			X	
Joliet Twp			X	
Lockport Twp			X	
Troy Twp			X	
All other Will County twps				X
Du Page County				X
Grundy County				X
Kane County				X
Kankakee County				X
Kendall County				X
Lake County				X
McHenry County				X
AQCR 68				
Jo Daviess County				X
AQCR 69				
Carroll County				X
Henry County				X

Illinois—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Mercer County				X
Rock Island County				X
Whiteside County				X
AQCR 70				
Madison County				
Wood River Twp			X	
Alton Twp			X	
All other Madison twps				X
Bond County				X
Clinton County				X
Monroe County				X
Randolph County				X
St. Clair County				X
Washington County				X
AQCR 71				
Bureau County				
Shelby Twp			X	
All other Bureau twps				X
La Salle County				X
Lee County				X
Marshall County				X
Putnam County				X
Stark County				X
AQCR 72				
Massac County			X	
Alexander County				X
Johnson County				X
Pope County				X
Pulaski County				X
Union County				X
AQCR 73				
Boone County				X
De Kalb County				X
Ogle County				X
Stephenson				X
Winnebago County				X
AQCR 74				
Clay County				X
Crawford County				X
Edwards County				X
Effingham County				X
Fayette County				X
Franklin County				X
Gallatin County				X
Hamilton County				X
Hardin County				X
Jackson County				X
Jasper County				X
Jefferson County				X
Lawrence County				X
Marion County				X
Perry County				X
Richland County				X
Saline County				X
Wabash County				X
Wayne County				X
White County				X
Williamson County				X
AQCR 75				
Christian County				
South Fork Twp			X	
All other twps				X
Sangamon County				
Capital Twp			X	
Cooper Twp			X	
Cotton Hill Twp			X	
Rochester Twp			X	

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Illinois—SO_x

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Woodside Twp			X	
All other twps				X
Adams County				X
Brown County				X
Calhoun County				X
Cass County				X
Greene County				X
Jersey County				X
Logan County				X
Macon County				X
Nacoupin County				X
Menard County				X
Montgomery County				X
Morgan County				X
Pike County				X
Schuyler County				X
Scott County				X

Illinois—O_x

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 65:		
Fulton County		X
Hancock County		X
Henderson County		X
Knox County		X
McDonough County		X
Mason County		X
Peoria County	X	
Tazewell County	X	
Warren County County		X
Woodford County		X
AQCR 66:		
Champaign County		X
Clark County		X
Coles County		X
Cumberland County		X
De Witt County		X
Douglas County		X
Edgar County		X
Ford County		X
Iroquois County		X
Livingston County		X
McLean County		X
Moultrie County		X
Piatt County		X
Shelby County		X
Vermilion County		X
AQCR 67:		
Cook County	X	
Du Page County	X	
Grundy County	X	
Kane County	X	
Kankakee County	X	
Kendall County	X	
Lake County	X	
McHenry County	X	
Will County	X	
AQCR 68:		
Jo Daviess County		X

Illinois—O_x

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 69:		
Carroll County		X
Henry County		X
Mercer County		X
Rock Island County		X
Whiteside County		X
AQCR 70:		
Bond County		X
Clinton County		X
Madison County	X	
Monroe County	X	
Randolph County		X
St. Clair County	X	
Washington County		X
AQCR 71:		
Bureau County		X
La Salle County	X	
Lee County		X
Marshall County		X
Putnam County		X
Stark County		X
AQCR 72:		
Alexander County		X
Johnson County		X
Massac County		X
Pope County		X
Pulaski County		X
Union County		X
AQCR 73:		
Boone County	X	
De Kalb County	X	
Ogle County		X
Stephenson County		X
Winnebago County		X
AQCR 74:		
Clay County		X
Crawford County		X
Edwards County		X
Effingham County		X
Fayette County		X
Franklin County		X
Gallatin County		X
Hamilton County		X
Hardin County		X
Jackson County		X
Jasper County		X
Jefferson County		X
Lawrence County		X
Marion County		X
Perry County		X
Richland County		X
Saline County		X
Wabash County		X
Wayne County		X
White County		X
Williamson County	X	
AQCR 75:		
Adams County	X	
Brown County		X
Calhoun County		X
Cass County		X
Christian County		X
Greene County		X
Jersey County		X
Logan County		X
Macon County		X
Macoupin County		X

Illinois—O_3

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Menard County		X
Montgomery County		X
Morgan County		X
Pike County		X
Sangamon County	X	
Schuyler County		X
Scott County		X

Illinois—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 65:		
Peoria County:		
City of Peoria (Area bounded by Green St. on the northeast and east, Water Street on the southeast, Liberty Street on the southwest, Franklin St. on the west, and Perry Avenue on the northwest)	X	
Remainder City of Peoria (portions of all Peoria, Limestone, Kickapoo, Richwoods and Medina Townships)		X
All other townships		X
Tazewell County:		
Cities of East Peoria and Creve Coeur (portions of Fondulac and Groveland Townships)		X
All other townships		X
Fulton County		X
Hancock County		X
Henderson County		X
Knox County		X
McDonough County		X
Mason County		X
Warren County		X
Woodford County		X
Lee County		X
AQCR 66:		
Champaign County:		
City of Champaign Township		X
Cunningham Township		X
All other townships		X
McLean County:		
City of Bloomington Township		X
City of Normal (portion of Normal Township)		X
All other townships		X
Vermilion County:		
City of Danville (portions of Danville and Newell Townships)		X
All other townships		X
Clark County		X
Coles County		X
Cumberland County		X
De Witt County		X
Douglas County		X
Edgar County		X
Ford County		X
Iroquois County		X
Livingston County		X
Moultrie County		X
Piatt County		X
Shelby County		X
AQCR 67:		
Cook County:		
City of Chicago—Expressway Corridor Area (100 feet from the edge of pavement on either side)		

Illinois—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Edens Expressway from junction with I-94 to Kennedy Expressway	X	
Kennedy Expressway from junction with Northwest Tollway to Dan Ryan Expressway	X	
Eisenhower from junction with East-West Tollway to Kennedy-Dan Ryan Expressway		
Dan Ryan Expressway from junction with Eisenhower Expressway to Calumet Expressway and I-57	X	
Stevenson Expressway from junction with Tri-State Tollway to Lake Shore Dr	X	
Cove Area (Define by Lake Shore Drive on the east, Roosevelt Rd. on the south, Halstead St. on the west, and Lake St. And Wacker Drive on the north)	X	
Kennedy-Edens Core Area (Defined by Lawrence Ave. on the north, Kenton St. on the east, Montrose Ave. on the south, and Cicero Ave. on the west)	X	
Remainder Cook County		X
Du Page County:		
Bloomingdale Township		X
Addison Township		X
Milton Township		X
York Township		X
Naperville Township		X
Lisle Township		X
Downers Grove Township		X
All other townships		X
Grundy County		X
Kane County:		
Dundee Township		X
Elgin Township		X
St. Charles Township		X
Geneva Township		X
Batavia Township		X
Aurora Township		X
All other townships		X
Kankakee County		X
Kendall County		X
Lake County:		
Deerfield Township		X
West Deerfield Township		X
Shields Township		X
Waukegan Township		X
Warren Township		X
Cuba Township		X
Libertyville Township		X
All other townships		X
McHenry County		X
Will County:		
Joliet Township		X
Lockport Township		X
All other townships		X
AQCR 68:		
Jo Daviess County		X
AQCR 69:		
Rock Island County:		
City of Moline (area bounded by 7th Avenue from 12th Street to 22nd Street on the southeast; 23rd Street from 7th Avenue to 3rd Avenue and continuing along that line to the Mississippi River on the northeast; 12th Street from 7th Avenue to 3rd Avenue and continuing along that line to the Mississippi River on the Southwest; the Mississippi River bank from the 12th Street alignment to the 23rd Street alignment on the northwest)	X	
Remainder of City of Moline		X
All other townships		X
Carrol County		X
Henry County		X
Mercer County		X
Whiteside County		X
AQCR 70:		
St. Clair County:		
City of E. St. Louis (portion of Canteen Township)		X
All other townships		X
Madison County:		
City of Alton Township		X

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Illinois—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
All other townships		X
Bond County		X
Clinton County		X
Monroe County		X
Randolph County		X
Washington County		X
AQCR 71:		
Bureau County		X
La Salle County		X
Lee County		X
Marshall County		X
Putnam County		X
Stark County		X
AQCR 72:		
Alexander County		X
Johnson County		X
Massac County		X
Pope County		X
Pulaski County		X
Union County		X
AQCR 73:		
Winnebago County:		
City of Rockford—(portion of Cherry Valley and Rockford Townships)		X
All other townships		X
Boone County		X
De Kalb County		X
Ogle County		X
Stephenson County		X
AQCR 74:		
Clay County		X
Crawford County		X
Edwards County		X
Effingham County		X
Fayette County		X
Franklin County		X
Gallatin County		X
Hamilton County		X
Hardin County		X
Jackson County		X
Jasper County		X
Jefferson County		X
Lawrence County		X
Marion County		X
Perry County		X
Richland County		X
Saline County		X
Wabash County		X
Wayne County		X
White County		X
Williamson County		X
AQCR 75:		
Adams County:		
City of Quincy (portions of Melrose, Ellington and Riverside Townships)		X
All other townships		X
Macon County:		
City of Decatur (portions of Decatur, Long Creek and Hickory Point Townships)		X
Sangamon County:		
City of Springfield (all of Capital township)		X
All other townships		X
Brown County		X
Calhoun County		X
Cass County		X
Christian County		X
Greene County		X
Jersey County		X
Logan County		X
Macoupin County		X

Illinois—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Menard County		X
Montgomery County		X
Morgan County		X
Pike County		X
Schuyler County		X
Scott County		X

Illinois—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 65:		
Fulton County		X
Hancock County		X
Henderson County		X
Knox County		X
McDonough County		X
Mason County		X
Peoria County		X
Tazewell County		X
Warren County		X
Woodford County		X
Lee County		X
AQCR 66:		
Champaign County		X
Clark County		X
Coles County		X
Cumberland County		X
De Witt County		X
Douglas County		X
Edgar County		X
Ford County		X
Iroquois County		X
Livingston County		X
McLean County		X
Moultrie County		X
Piatt County		X
Shelby County		X
Vermilion County		X
AQCR 67:		
Cook County, Central Core Area (Wacker Drive on the north and west, Michigan Avenue on the east and Harrison St. on the south)	X	
Remainder Cook County		X
Du Page County		X
Grundy County		X
Kane County		X
Kankakee County		X
Kendall County		X
Lake County		X
McHenry County		X
Will County		X
AQCR 68:		
Jo Daviess County		X
AQCR 69:		
Carroll County		X
Henry County		X
Mercer County		X
Rock Island County		X
Whiteside County		X

Illinois—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 70:		
Bond County		X
Clinton County		X
Madison County		X
Monroe County		X
Randolph County		X
St. Clair County		X
Washington County		X
AQCR 71:		
Bureau County		X
La Salle County		X
Lee County		X
Marshall County		X
Putnam County		X
Stark County		X
AQCR 72:		
Alexander County		X
Johnson County		X
Massac County		X
Pope County		X
Pulaski County		X
Union County		X
AQCR 73:		
Boone County		X
De Kalb County		X
Ogle County		X
Stephenson County		X
Winnebago County		X
AQCR 74:		
Clay County		X
Crawford County		X
Edwards County		X
Effingham County		X
Fayette County		X
Franklin County		X
Gallatin County		X
Hamilton County		X
Hardin County		X
Jackson County		X
Jasper County		X
Jefferson County		X
Lawrence County		X
Marion County		X
Perry County		X
Richland County		X
Saline County		X
Wabash County		X
Wayne County		X
White County		X
Williamson County		X
AQCR 75:		
Adams County		X
Brown County		X
Calhoun County		X
Cass County		X
Christian County		X
Greene County		X
Jersey County		X
Logan County		X
Macon County		X
Macoupin County		X
Menard County		X
Montgomery County		X
Morgan County		X
Pike County		X
Sangamon County		X
Schuyler County		X

Illinois—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Scott County		X

(Secs. 107(d), 171(2), 301(e) of the Clean Air Act, as amended (42 U.S.C. 7407(a), 7501(2), 7601(a)))

[43 FR 8964, Mar. 3, 1978, as amended at 43 FR 46004, Oct. 5, 1978; 45 FR 6787, Jan. 30, 1980; 45 FR 42284, June 24, 1980; 45 FR 48132, July 18, 1980]

§ 81.315 Indiana.

Indiana—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Clark County:				
The area included in Charlestown, Jeffersonville, Silver Creek & Utica Townships	X			
The remainder of Clark County				X
Dearborn County:				
The area included in Center, Hogan, Lawrenceburg & Manchester Townships	X			
The remainder of Dearborn County				X
Dubois County:				
The area included in Bainbridge, Marion & Patoika Townships	X			
The remainder of Dubois County				X
Floyd County			X	
Howard County:				
The area included within Center & Howard Townships		X		
The remainder of Howard County				X
Lake County:				
An area bounded on the north by Lake Michigan, on the west by the Indiana-Illinois State line, on the south by U.S. 30 from the State line to the intersection of I-65 then following I-65 to the intersection of I-94 then following I-94 to the Lake-Porter County line & on the east by the Lake-Porter County line	X			
The remainder of Lake County				X
La Porte				X
Marion County:				
The area of Washington Township east of Fall Creek and the area of Franklin Township south of Thompson Rd. & east of Five Points Rd				X
The remainder of Marion County	X			
Porter County	X			
St. Joseph County:				
The area north of Kern Rd. & east of Pine Rd		X		
The remainder of St. Joseph County				X
Sullivan County			[1]X	
Vanderburgh County:				
The area included in the City of Evansville & Pidgeon Township		X		
The remainder of Vanderburgh County				X
Vigo County:				
The area included within Harrison, Honey Creek, Fayette, Lost Creek, Otter Creek & Sugar Creek Townships	X			
The remainder of Vigo County				X
Wayne County:				
The area included within Boston, Center, Wayne, Webster Townships			X	

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Indiana—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
All portions of all other counties in Indiana				X

[1]EPA designation replaces State designation.

Indiana—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Dearborn County			X	
Gibson County			[1]X	
Jefferson County			[1]X	
Lake County:				
An area bounded on the north by Lake Michigan, on the west by the Indiana-Illinois State line, on the south by U.S. 30 from the State line to the intersection of I-65 then following I-65 to the intersection of I-94 then following I-94 to the Lake-Porter County line, & on the east by the Lake-Porter County line	X			
The remainder of Lake County				X
LaPorte County:				
An area bound on the north by Lake Michigan & the Indiana-Michigan State line, on the west by the LaPorte-Porter County line, & on the south & east by I-94	X			
The remainder of LaPorte County				X
Marion County	X			
Porter County:				
An area bound on the north by Lake Michigan, on the west by the Lake-Porter County line, on the south by I-80 & 90 & on the east by the LaPorte-Porter County line				
The remainder of Porter County				X
Vigo County	X			
Warrick County			[1]X	
Wayne County:				
The area included within Boston, Center, Franklin, Wayne & Webster Townships	X			
The remainder of Wayne County				X
All portions of all other Indiana Counties				X

[1]EPA designation replaces State designation.

Indiana—O_3

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Allen County	[1]X	
Clark County	[1]X	
Elkhart County	[1]X	
Floyd County	X	
Lake County	X	
Marion County	X	
Porter County	[1]X	
St. Joseph County	[1]X	
Vanderburgh County		X
All portions of all other Indiana Counties		X

[1]EPA designation replaces State designation.

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Indiana—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Lake County:		
City of East Chicago (area bound by Columbus Drive on the north, the Indiana Harbor Canal on the west, 148th St. if extended, on the south, & Euclid Ave. on the east)	X	
The remainder of East Chicago & Lake County		X
Marion County:		
City of Indianapolis (area bound by 11th St. on the north, Capitol on the west, Georgia St. on the south, & Delaware on the east)	X	
The remainder of Indianapolis & Marion County		X
All portions of all other Indiana Counties		X

Indiana—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
All portions of all Indiana Counties		X

[43 FR 8964, Mar. 3, 1978, as amended at 43 FR 46007, Oct. 5, 1978; 46 FR 47222, Sept. 25, 1981; 46 FR 54341, Nov. 2, 1981; 46 FR 63272, Dec. 31, 1981; 47 FR 11016, Mar. 15, 1982]

§ 81.316 Iowa.

Iowa—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Central portion of Waterloo		[1]X		
Cedar Falls Township			X	
East Waterloo Township			X	
Remainder of Black Hawk County				X
Northern portion of Mason City including an area about one mile north of the city limits	X	X		
Central portion of Mason City including about 1 mile around the above area in the city and about 2 miles northwest of the above area		[1]X		
Falls Township			X	
Lake Township			X	
Lincoln Township			X	
Remainder of Cerro Gordo County				X
An area around downtown Clinton		[1]X		
Camanche Township			X	
Remainder of Clinton County				X
Burlington Township			X	
Remainder of Des Moines County				X
Iowa City Township			X	
Remainder of Johnson County				X
An area in and near Keokuk			X	
Jackson Township			X	
Jefferson Township			X	
Madison Township			X	
Remainder of Lee County				X
An area of central and southern Cedar Rapids	X	X		
An area about 1 mile outside the above area		[1]X		
Bertram Township			X	
Clinton Township			X	

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Iowa—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
College Township			X	
Fairfax Township			X	
Marion Township			X	
Monroe Township			X	
Putnam Township			X	
Remainder of Linn County				X
The central portion of Marshalltown		[1]X		
Remainder of Marshall County				X
The central and southern portions of Muscatine		[1]X		
Fruitland Township			X	
Sweetland Township			X	
Montpelier Township			X	
Remainder of Muscatine County				X
Areas in central Des Moines, Ankeny and part of West Des Moines	X	X		
An area around the above area generally including Des Moines and parts of West Des Moines, Urbandale and Windsor Heights		[1]X		
Clay Township			X	
Douglas Township			X	
Jefferson Township			X	
Remainder of Polk County				X
The western portion of Council Bluffs and Carter Lake		[1]X		
Lake Township			X	
Lewis Township			X	
Remainder of Pottawattamie County				X
The central portion of Davenport	X	X		
Portions of Buffalo, Davenport, Bettendorf and Riverdale		[1]X		
Remainder of Scott County				X
Center Township			X	
Remainder of Wapello County				X
The central portion Fort Dodge		[1]X		
Otho Township			X	
Remainder of Webster County				X
The central and southern portions of Sioux City		[1]X		
Liberty Township			X	
Woodbury Township			X	
Remainder of Woodbury County				X
Remainder of State				X

[1]EPA designation replaces State designation.

Iowa—SO_2

Designated area	Primary standard exceeded § (d)(1)(B)	Secondary standard exceeded § (d)(1)(C)	Unclassifiable § (d)(1)(D)	Attainment
Julien Township	[1]X	[1]X		
Remainder of Dubuque County				X
Remainder of State				X

[1]EPA designation replaces State designation.

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Iowa—O_3

Designated area	Primary standard exceeded § (d)(1)(A)	Unclasssifiable and/or attainment § (d)(1)(E)
Entire State		X

Iowa—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Des Moines Township	X	
Lee Township	X	
Remainder of Polk County		X
City of Dubuque (partial)	X	
Remainder of Dubuque County		X
Remainder of State		X

Iowa—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Entire State		X

[43 FR 8964, Mar. 3, 1978, as amended at 45 FR 14574, Mar. 6, 1980; 46 FR 17558, Mar. 19, 1981; 46 FR 48930, Oct. 5, 1981; 47 FR 19526, May 6, 1982]

EFFECTIVE DATE NOTE: At 47 FR 19526, May 6, 1982, effective July 6, 1982, in the table "Iowa-TSP," the line reading "areas in central and southern Des Moines, Ankeny and part of West Des Moines" was amended by removing the words "and southern."

§ 81.317 Kansas.

Kansas—TSP

Designated Area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Wyandotte County:				
a. Most of the area between I-635 and the Missouri state line	X			
b. An area extending about three miles west of the above area		X		
Topeka, Kansas, area bounded by: Kansas River on the east and south, Vail Avenue on the west and Lyman Avenue on the north		X		
Remainder of State				X

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Kansas—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Entire State				X

Kansas—O_3

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Kansas City AQCR (094):		
Wyandotte County	[1]X	
Johnson County	[1]X	
South Central AQCR (099): Sedgwick County		X
Northwest AQCR (095): Douglas County	[1]X	
Remainder of State		X

[1]EPA designation replaces State designation.

Kansas—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Kansas City, Kansas area, bounded by: 6th Street on the east, Washington Street on the north, 18th Street on the west, and Barnett Street on the south		X
Wichita, Kansas area, bounded by: Grove Street on the east, 13th Street on the north, the Arkansas River on the west, and Kellogg Avenue on the south	X	
Remainder of State		X

Kansas—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Entire State		X

[43 FR 8964, Mar. 3, 1978, as amended at 45 FR 73048, Nov. 4, 1980]

§ 81.318 Kentucky.

Kentucky—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Bell County	X			
Boyd County	X			
That portion of Bullitt Co. in Shepherdsville	X			
That portion of Cambell Co. in Newport	X			
That portion of Daviess Co. in Owensboro	X			

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Kentucky—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
That portion of Henderson Co. in Henderson	X			
Jefferson County	X			
That portion of Lawrence Co. in Louisa	X			
McCracken County	X			
Marshall County		X		
That portion of Madison Co. in Richmond	X			
Muhlenberg County	X			
That portion of Perry Co. in Hazard	X			
That portion of Pike Co. in Pikeville	X			
That portion of Whitley Co. in Corbin	X			
Rest of State				X

Kentucky—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
That portion of Boyd County south of UTM northing line 4251 km	X			
Jefferson County	X	X		
Muhlenberg County	X	X		
Rest of State				X

Kentucky—O_3

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Boyd County	X	
Cincinnati Area—Boone, Kenton, and Campbell Counties	X	
Fayette County	X	
Jefferson County	X	
Rest of State		X

Kentucky—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Jefferson County	X	
Rest of State		X

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Kentucky—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Statewide		X

(Secs. 107, 171, 301 of the Clean Air Act (42 U.S.C. 7407, 7501, 7601))

[43 FR 8964, Mar. 3, 1978, as amended at 43 FR 40425, Sept. 11, 1978; 44 FR 41783, July 18, 1979; 44 FR 63105, Nov. 2, 1979; 46 FR 46325, Sept. 18, 1981; 46 FR 57047, Nov. 20, 1981; 47 FR 18862, May 3, 1982]

EFFECTIVE DATE NOTE: At 47 FR 18861, May 3, 1982, effective July 2, 1982, the "Kentucky—SO_2," table was amended by removing the entry titled "McCracken County."

§ 81.319 Louisiana.

Louisiana—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
AQCR 019				X
AQCR 022				X
AQCR 106				X

Louisiana—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
AQCR 019				X
AQCR 022				X
AQCR 106				X

Louisiana—O_3

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 019		[1]X
AQCR 022:		
Caddo Parish	[1]X	
Bossier Parish	[1]X	
Remainder of AQCR		[1]X
AQCR 106:		
Ascension Parish	X	
Iberville Parish	X	
St. James Parish	X	
St. John the Baptist Parish	X	
West Baton Rouge Parish	X	
East Baton Rouge Parish	X	
Calcasieu Parish	X	
Orleans Parish	X	
Jefferson Parish	X	
St. Bernard Parish	X	
St. Charles Parish	X	

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Louisiana—O_x

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Grant Parish	X	
Beauregard Parish	[1]X	
Lafourche Parish	[1]X	
Point Coupee Parish	[1]X	
Lafayette Parish	[1]X	
St. Mary Parish	[1]X	
Remainder of AQCR		[1]X

[1]EPA designation replaces State designation.

Louisiana—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 019		X
AQCR 022		X
AQCR 106		X

Louisiana—NO_x

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 019		X
AQCR 022		X
AQCR 106		X

[43 FR 8964, Mar. 3, 1978, as amended at 43 FR 40425, Sept. 11, 1978]

§ 81.320 Maine.

Maine—TSP

Designated areas	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
AQCR 109—Bangor & Brewer	X			
Lincoln	X			
Old Town			X	
Baileyville		X		
Rest of Region				X

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BEST DOCUMENT AVAILABLE

Maine—SO_x

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
AQCR 110				X
AQCR 107				X
AQCR 109—Millinocket	X			
Rest of Region				X
AQCR 108—Madawaska			X	
Rest of Region				X
AQCR 111				X

Maine—O_x

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 107 (Central Maine)	X	
AQCR 110 (Metropolitan Portland)	X	
AQCR 109 (Downeast)		X
AQCR 108 (Aroostook)		X
AQCR 111 (Northwest Maine)		X

Maine—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 110		X
AQCR 107—Lewiston (area bounded by and including Main Street, Park Street, Willow Street, and Canal Street)	X	
AQCR 107—Rest of the Region		X
AQCR 109—Bangor (area bounded by and including Kenduskeag Stream, Franklin Street, Columbia Street, and Water Street)	X	
AQCR 109—Rest of the Region		X
AQCR 108		X
AQCR 111		X

Maine—NO_x

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 110		X
AQCR 107		X
AQCR 109		X
AQCR 108		X
AQCR 111		X

[43 FR 8964, Mar. 3, 1978, as amended at 45 FR 10775, Feb. 19, 1980; 46 FR 33524, June 30, 1981; 47 FR 19138, May 4, 1982]

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§ 81.321 Maryland.

Maryland—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Metropolitan Baltimore Intrastate AQCR:				
(a) Baltimore City:				
#111 Zones 61, 65-68 [1]		X		
#112 Zone 72		X		
#113 Zones 76-80		X		
#117 Zones 94-100, 102, 103, 105-11		X		
#118 Zones 114-137		X		
#119 Zones 138, 140, 144, 146, 149	X			
Zones 139, 141-143, 145, 147, 150-56		X		
#120 Zones 157-66	X			
#121 Zones 168-70, 172, 176-78, 180, 181	X			
Zones 167, 171, 173-75, 179, 182		X		
#123 Zones 187-90		X		
#Zones 193-198	X			
Zones 191, 192	X			
#125 Zones 199-203		X		
#126 Zone 207	X			
Zones 204-06		X		
(b) Baltimore County:				
#325 Zones 417, 418, 420, 421		X		
#326 Zones 428, 431		X		
#328 Zone 446		X		
#329 Zones 449, 453-58	X			
Zones 450-52, 459		X		
#330 Zones 461, 462	X			
Zones 460, 463-68		X		
#331 Zones 469-72		X		
(c) Anne Arundel County:				
#201 Zones 208, 209		X		
#203 Zones 221-28		X		
#204 Zones 230		X		
(d) Remainder of AQCR				X
Cumberland-Keyser Interstate AQCR:				
(a) Election District No. 8, Luke, MD			X	
(b) Remainder AQCR				X
Central Maryland Interstate AQCR				X
National Capital Interstate AQCR				X
Southern Maryland Intrastate AQCR				X
Eastern Shore Intrastate AQCR				X

[1] Regional Planning Districts—defined by the Baltimore Regional Planning Council. Maps showing Districts and non-attainment areas available for inspection at the offices of: EPA, Region III, 6th and Walnut Streets, Phila., Pa. 19106; Md. Bureau of Air Quality and Noise Control, 201 West Preston Street, Baltimore, Md. 21201.

Maryland—SO_x

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Cumberland-Keyser Interstate AQCR, Election District No. 8, Luke, Md			X	
Remainder of State				X

BEST DOCUMENT AVAILABLE

Maryland—O_3

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Central Maryland Intrastate AQCR		X
Metropolitan Baltimore Intrastate AQCR	X	
National Capital Interstate AQCR—Maryland Portion	X	
Southern Maryland Intrastate AQCR		X
Eastern Shore Intrastate AQCR		X
Cumberland-Keyser Interstate AQCR		X

Maryland—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Cumberland-Keyser Intrastate AQCR		X
Central Maryland Intrastate AQCR		X
Metropolitan Baltimore Instrastate AQCR:		
(a) Baltimore City, Regional Planning District No. 118 (generally corresponding to the Central Business District)	X	
(b) Remainder of AQCR		X
National Capital Intrastate AQCR—Maryland Portion:		
(a) Prince Georges County election districts 2, 6, 12, 16, 17, 18	X	
(b) Montgomery County, election districts 4, 7, 13	X	
(c) Remainder AQCR		X
Southern Maryland Intrastate AQCR		X
Eastern Shore Intrastate AQCR		X

Maryland—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
State of Maryland		X

(Secs. 107(d), 171(2), 301(a) of the Clean Air Act, as amended (42 U.S.C. 7407(d), 7501(2), 7601(a)))

[43 FR 40510, Sept. 12, 1978, as amended at 45 FR 21244, Apr. 1, 1980; 45 FR 24470, Apr. 10, 1980; 46 FR 43156, Aug. 27, 1981; 46 FR 58085, Nov. 30, 1981]

§ 81.322 Massachusetts.

Massachusetts—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Berkshire AQCR:				
Adams		X		
North Adams		X		
Pittsfield		X		
All other cities and towns				X

BEST DOCUMENT AVAILABLE

Massachusetts—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Central Massachusetts AQCR:				
Worcester	X			
Athol		X		
Gardner			X	
Grafton			X	
Leominster			X	
Millbury			X	
Shrewsbury			X	
All other cities and towns				X
Merrimack Valley AQCR:				
Haverhill		X		
Lawrence		X		
All other cities and towns				X
Pioneer Valley AQCR:				
Springfield		X		
Chicopee			X	
Holyoke			X	
Northampton			X	
South Hadley			X	
West Springfield			X	
All other cities and towns				X
Southeastern Massachusetts AQCR:				
Fall River		X		
Attleboro			X	
New Bedford			X	
Taunton			X	
All other cities and towns				X
Metropolitan Boston AQCR:				
Topsfield			X	
Wakefield			X	
Walpole			X	
Watertown			X	
Wayland			X	
Wellesley			X	
Wenham			X	
Weston			X	
Westwood			X	
Weymouth			X	
Winchester			X	
Winthrop			X	
Boston			X	
Danvers		X		
Cambridge		X		
Framingham		X		
Lynn		X		
Marblehead		X		
Norwood		X		
Medford		X		
Peabody		X		
Quincy		X		
Revere		X		
Swampscott		X		
Waltham		X		
Arlington			X	
Belmont			X	
Beverly			X	
Braintree			X	
Brockton			X	
Brookline			X	
Canton			X	
Chelsea			X	
Dedham			X	
Everett			X	
Malden			X	
Marlborough			X	
Melrose			X	
Middleton			X	

BEST DOCUMENT AVAILABLE

Massachusetts—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Milton			X	
Natick			X	
Needham			X	
Newton			X	
Salem			X	
Saugus			X	
Somerville			X	
Southborough			X	
Stoneham			X	
All other cities and towns				X

Massachusetts—SO_x

Designated Area	Does Not Meet Primary Standards	Does Not Meet Secondary Standards	Cannot Be Classified	Better Than National Standard
Boston and Milton				X
Belchertown, Granby, Ludlow, Palmer, South Hadley and Wilbraham				X
Remaining individual cities and towns [1]				X

[1] Each city and town, with the exception of Boston and Milton and Belchertown, Granby, Ludlow, Palmer, South Hadley and Wilbraham as indicated above, is a separate Section 107 designated attainment area.

Massachusetts—O_x

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Statewide	X	

Massachusetts—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Berkshire AQCR:		
All cities and towns		X
Central Massachusetts AQCR:		
Worcester	X	
All cities and towns		X
Merrimack Valley AQCR:		
Lowell	X	
All other cities and towns		X
Metropolitan Boston AQCR:		
Boston	X	
Cambridge	X	
Quincy	X	
Medford	X	
Waltham	X	
All other cities and towns		X
Pioneer Valley AQCR:		
Springfield	X	
All other cities and towns		X

BEST DOCUMENT AVAILABLE

Massachusetts—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Southeastern Massachusetts AQCR:		
All cities and towns		X

Massachusetts—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Statewide		X

(Sec. 110 of the Clean Air Act, as amended)

[43 FR 8964, Mar. 3, 1978, as amended at 43 FR 40426, Sept. 11, 1978; 45 FR 2044, Jan. 10, 1980; 45 FR 61304, Sept. 16, 1980; 46 FR 23420, Apr. 27, 1981; 46 FR 40190, Aug. 7, 1981]

§ 81.323 Michigan.

Michigan—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
AQCR 82 (Michigan portion)				X
AQCR 122—Except subareas defined				X
1. Bay County: R5E, T14N, Sections 14-16 and 21-23		X		
2. Genesee County:				
a. Starting on Industrial Avenue, north to Stewart Avenue, east to Hitchcock Street, south to Olive Avenue (extended), south to Robert T. Longway Boulevard, west and southwest to Industrial Avenue	X			
b. Starting on Industrial Avenue, north to Pierson Road, east to Dort Highway, south to Hitchcock Street, south to Olive Avenue (extended), south to Robert. T. Longway Boulevard, west and southwest to Industrial Avenue		X		
3. Kent County: R11W, T7N, Sections 19, 30, 31, R12W, T7N, Sections 22-27 and 34-36		X		
4. Lapeer County: T7N-R12E, that portion of Section 17 which lies south of M-21 and east of Fairground Road	X			
5. Mason County: R18W, T18N, Sections 13, 14, 23 & 24		X		
6. Midland County R2E, T14N, Sections 14-16, 21-23, 26-28, 33-35		X		
7. Muskegon County: R16W, T9N, Sections 5 & 6, R16W, T10N, Sections 21, 22 & 27-34		X		
8. Saginaw County:				
a. Starting at Tittabawassee Road, east to I-75, east and south to Washington Avenue, west to 6th Street, north to Carrolton Street, northeast to Zilwaukee Street, north to Westervelt Street, north to Tittabawassee Road	X			
b. Northeast Section: Starting on Tittabawassee Road, east to I-75, south to Wadsworth Avenue, west to I-675, west and north to Tittabawassee Road. Southwest Section: T12N-R4E, the eastern half of Section 34 (that which is east of Maple Street) and Section 35		X		
AQCR 123—Except subareas defined				X
1. Macomb County:				
a. R14E, T4N, Sections 27, 28, 33 & 34		X		
b. All of County South of 20 Mile Rd		X		

BEST DOCUMENT AVAILABLE

Michigan—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
2. Oakland County:				
a. R10E, T3N, Sections 15, 16, 21, 22, 27 & 28		X		
b. Area included within: Coolidge Rd., 10 Mile Rd. Campbell Rd., 14 Mile Rd., Dequindre Rd. & 8 Mile Rd		X		
3. St. Clair County: R17E, T6N, Sections 2-4, 9-11, 14-16, 21, 22 & 28		X		
4. Wayne County:				
a. Area included within: Lake St. Clair to 8 Mile Rd. to Schaefer Rd. to McNichols Rd. to Greenfield Av. to Schoolcraft Av. to Evergreen Rd. to Joy Rd. to Telegraph Rd. to Ford Rd., to Beech-Daly Rd. to Cherry Hill Rd. to Inkster Rd. to Carlysle St. to Middle Belt Rd. to Van Born Rd. to Wayne Rd. to Ecorse Rd. to Haggerty Hwy. to Tyler Rd. to Belleville Rd. to I-94 to Rawsonville Rd. to Oakville-Waltz Rd. to Will-Carlton Rd. to the Huron River to Lake Erie except for the subarea under b		X		
b. Area included within: Lake St. Clair-Moross Rd. to 7 Mile Rd. to Van Dyke Rd. to 8 Mile Rd. to Wyoming Rd. to 7 Mile Rd. to Schaefer Rd. to Fenkell Rd. to Greenfield Av. to Joy Rd. to Southfield Expressway to Ford Rd. to Telegraph Rd. to Cherry Hill Rd. to Beech-Daly Rd. extended to Michigan Av. to Inkster Rd. to Carlysle St. to Middle Belt Rd. to Van Born Rd. to Wayne Rd. to Pennsylvania Rd. to Middle Belt Rd. to Sibley Rd. to Telegraph Rd. to King Rd. to Grange Rd. to Sibley Rd. to Jefferson Av. to Bridge St. (Grosse Ile) extended to Detroit River	X			
AQCR 124 (Michigan portion) Except subareas defined				X
1. Monroe County:				
a. Starting where Sandy Creek empties into Lake Erie, northwest to Maple Avenue (extended NNE), southwest to Elm Avenue, west to Herr Road, south to Dunbar Road, and east to Plum Creek (which empties into Lake Erie)	X			
b. T5S-R10E, Sections 8, 9, and 15-17		X		
AQCR 125—Except subareas defined				X.
1. Calhoun County: R4W, T2S, Section 34	X			
2. Ingham County: R2W, T4N, Sections 2-11 & 14-23		X		
AQCR 126—Except subareas as defined				X
1. Delta County R22W, T39N, Sections S 1/2 17, S 1/2 18, 19; and 30		X		
2. Emmet County: R6W, T34N, Sections 1-3 & 9-12		X		
3. Manistee County: R16W, T21N, Sections 7, 18 & 19, R17W, T21N, Sections 12 & 13		X		
4. Marquette County: R25W, T48N, Sections 1 & 2			X	

[1] EPA designation replaces State designation.

Michigan—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
AQCR 82 (Michigan portion)				X
AQCR 122—Except subareas defined				X
1. Midland County, R2E, T13N, Sections 1-6, R2E, T13N, Sections 1-6, R2E, T14N, Sections 7-36	X			
AQCR 123				X
AQCR 124 (Michigan portion)				X
AQCR 125—Except subareas defined				X
1. Ingram County, R2W, T4N, Sections 7-11, 14-23, and 26-35	X			
AQCR 126				X

BEST DOCUMENT AVAILABLE

Michigan—O_x

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 82 (Michigan portion)	X	
AQCR 122—Except subareas defined		X
1. Muskegon, Ottawa, Allegan, Kent, Montcalm, Ionia, Gratiot, Midland, Bay, Saginaw, Shiawasee, Genesse, Tuscola, Lapeer, Sanilac and Huron Counties	X	
AQCR 123	X	
AQCR 124 (Michigan portion)	X	
AQCR 125	X	
AQCR 126—Except subareas defined		X
1. Marquette County	X	

Michigan—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 82 (Michigan portion)		X
AQCR 122—Except subareas defined:		
Saginaw County: Starting at the SE corner of the NAA at the intersection of Needham and Findley Roads, the southern boundary is west on Needham Road to N. 14th, south on N. 14th to Farwell and west on Farwell to N. 6th. The western boundary runs north from the Farwell-N. 6th intersection to the north boundary of the southern half of the SW quarter of Section 7. The NAA is bounded on the north by the northern boundary of the southern half of the SW and SE quarters of Section 7 and the northern boundary of the southern half of the SW and SE quarters of Section 8 from N. 6th to Findley Road. The eastern boundary of the NAA runs along Findley Road south to the intersection of Findley and Needham Roads	X	
The remainder of Saginaw County		X
AQCR 123—Except subareas defined		X
1. Macomb, Oakland, Wayne Counties, Area included within the following (counterclockwise): Lake St. Clair to 14 Mile Road to Kelly Road, N. to 15 Mile Road to Hayes Road, S. to 14 Mile Road to Clawson City boundary, following N. Clawson City boundary to N. Royal Oak City boundary to 13 Mile Road to Evergreen Road to southern Beverly Hills City boundary to southern Bingham Farms City boundary to southern Frankling City boundary to Inkster Road, south to Pennsylvania Road, extending east to the Detroit River	X	
AQCR 124 (Michigan portion)		X
AQCR 125		X
AQCR 126		X

Michigan—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
State of Michigan		X

[43 FR 8964, Mar. 3, 1978, as amended at 43 FR 46008, Oct. 5, 1978; 45 FR 27936, Apr. 25, 1980; 46 FR 46575, Sept. 21, 1981; 46 FR 55109, Nov. 6, 1981; 47 FR 6428, Feb. 12, 1982; 47 FR 7229, Feb. 18, 1982]

BEST DOCUMENT AVAILABLE

§ 81.324 Minnesota.

Minnesota—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
AQCR 131	[1]X			
City of International Falls		X		
The City of Duluth (starting point is the south corner of the Duluth Arena. Go northwest on Commerce Street to I-35 corridor. Continue northeast on proposed I-35 corridor to Second Avenue East. Continue northwest on Second Avenue East to Superior Street (Minnesota U.S. 61). Go southwest on Superior Street to I-35 corridor. Follow I-35 corridor to 41st Avenue West. Continue southeast on 41st Avenue West to dock line. Follow dock line and harbor lines to the south corner of the Duluth Arena.)	X			
The City of Duluth (starting point is Superior Street and Second Avenue East. Go northwest on Second Avenue East to Second Street (Minnesota 281). Continue southwest on Second Street to Fourth Avenue West. On Fourth Avenue West go northwest to Third Street. Continue southwest to Mesaba Avenue. On Mesaba Avenue go south to Second Street. Go southwest on Second Street to Eighth Avenue West. On Eighth Avenue West continue southeast to First Street. Follow First Street southwest to Tenth Avenue West. On Tenth Avenue West go northwest to Second Street. Continue southwest on Second Street to 14th Avenue West. On 14th Avenue West go southeast to First Street. Follow First Street southwest to 17th Avenue West. Go northwest on 17th Avenue West to Second Street. On Second Street continue southwest to 30th Avenue West. Follow 30th Avenue West to Vernon Street. Continue west on Vernon Street to Grand Avenue. On Grand Avenue go southwest to 34th Avenue West. On 34th Avenue West continue southeast to Second Street. From Second Street go southwest to the Northern Pacific Railway Line. Follow the Northern Pacific Railway Line to 61st Avenue West. From 61st Avenue West go to the dock line. Follow the dock line to 41st Avenue West. On 41st Avenue West continue northwest to the I-35 corridor. Go northeast along the I-35 corridor to Superior Street (Minnesota U.S. 61). On Superior Street go northeast to Second Avenue East.)		X		
City of Red Wing		X		
City of East Grant Forks				X
City of Cloquet		X		
City of Silver Bay				X
Mesabi Iron Range identified by county and township and range numbers:				
St. Louis County:				
T56N, R18W		X		
T57N, R17-19W		X		
T57N, R20 Section 7		X		
T58N, R16-18W		X		
T59N, R13W; R16-18W		X		
T60N, R12-13W		X		
Sherburne County			X	
St. Clouds Township (Stearnes County)			X	
City of Springfield and Burnstown Township (Brown County)			X	
Remainder of State				X

[1]EPA designation replaces State designation.

BEST DOCUMENT AVAILABLE

Minnesota—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
AQCR 131	X			
City of Rochester	X			
Sherburne County			X	
Remainder of State				X

Minnesota—O_3

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 131		X
Sherburne County		X
St. Louis County		X
Carlton County		X
Lake County		X
Olmsted County		X
Remainder of State		X

Minnesota—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 131	X	
City of Duluth	X	
City of Rochester	X	
City of St. Cloud	X	
Remainder of State		X

Minnesota—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
State of Minnesota		X

[43 FR 8964, Mar. 3, 1978, as amended at 43 FR 46010, Oct. 5, 1978; 45 FR 50752, July 31, 1980; 46 FR 51744, Oct. 22, 1981; 47 FR 20306, May 12, 1982]

EFFECTIVE DATE NOTE: At 47 FR 20306, May 12, 1982, effective July 12, 1982, the entries for "City of East Grand Forks and City of Silver Bay" in the table "Minnesota—TSP" were revised. For the convenience of the user, the superseded text appears below.

BEST DOCUMENT AVAILABLE

§ 81.324 Minnesota.

Minnesota—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
• • •	•	•	•	•
City of E. Grand Forks		X		
• • •	•	•	•	•
City of Silver Bay		X		
• • •	•	•	•	•

§ 81.325 Mississippi.

Mississippi—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
That portion of Jones County in southern section of Laurel	X			
Rest of State				X

BEST DOCUMENT AVAILABLE

Mississippi—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Statewide				X

Mississippi—O_x

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Statewide		X

Mississippi—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Statewide		X

Mississippi—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Statewide		X

§ 81.326 Missouri.

Missouri—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
St. Louis AQCR (070):				
St. Louis (an area extending west about 2 miles from the Mississippi River, north to near I-270 and south to about 1 mile beyond the city limits)	X	X		
Remainder of the City of St. Louis		X		
Remainder of AQCR				X
Kansas City AQCR (094):				
Kansas City (an area extending approximately from the Kansas State line east along 55th St. to I-435, then north to I-70, east to Maland Rd., north to I-35, southwest to I-29, northwest to I-635, and southwest to the state line)	X	X		

BEST DOCUMENT AVAILABLE

Missouri—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Kansas City (an area extending approximately from the Kansas State line east along Red Bridge Rd. and 115th St. to Missouri Highway 291, then north to I-70, east to Missouri Highway 7, north to U.S. Highway 24 west to Missouri Highway 291, north to Missouri Highway 152, west to Missouri Highway 9, south to U.S. Highway FF, and due south to the State line)		X		
St. Joseph City limits	X	X		
Remainder of AQCR				X
Northern AQCR (137): Mexico (township 51 north, range 9 west)			X	
Columbia City limits		[1]X		
Pike County				X
Ralls County				X
Remainder of AQCR				X
Southeastern AQCR (138): Township 23 north, range 14 east and township 22 north, range 14 east (New Madrid)		[1]X		
Remainder of AQCR				X
Southwestern AQCR (139)				X

[1]EPA designation replaces State designation.

Missouri—SO_x

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Northern AQCR (137):				
Pike County				X
Ralls County				X
Remainder of AQCR				X
Remainder of State				X

Missouri—O_x

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
St. Louis AQCR (070):		
Entire area	X	
Kansas City AQCR (094):		
Jackson County	X	
Clay County	X	
Platte County	X	
Remainder of AQCR		X
Northern AQCR (137):		
Pike County		X
Ralls County		X
Remainder of AQCR		X
Remainder of State		X

BEST DOCUMENT AVAILABLE

Missouri—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
St. Louis AQCR (070):		
The area encompassed by I-270 and the Mississippi River	X	
Northern AQCR (137):		
Pike County		X
Ralls County		X
Remainder of AQCR		X
Remainder of State		X

Missouri—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Northern AQCR (137):		
Pike County		X
Ralls County		X
Remainder of AQCR		X
Remainder of State		X

[43 FR 8964, Mar. 3, 1978, as amended at 45 FR 22931, Apr. 4, 1980; 45 FR 27761, Apr. 24, 1980; 45 FR 62821, Sept. 22, 1980; 46 FR 899, Jan. 5, 1981; 46 FR 40008, Aug. 6, 1981]

§ 81.327 Montana.

Montana—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
City of Missoula	X			
Colstrip Area	X			
City of Columbia Falls	X			
Missoula Area		X		
Butte Area	[1]X			
Billings Area		X		
Great Falls Area		X		
East Helena Area		X		
Remainder of State				X

[1]EPA designation replaces State designation.

Montana—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Laurel Area	X			
East Helena Area	X	X		
Anaconda Area	X	X		
Rest of State				X

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Montana—O_3

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Yellowstone County		[1]X
Rest of State		X

[1]EPA designation replaces State designation.

Montana—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
City of Billings	[1]X	
City of Missoula	X	
Great Falls designated area	X	
Rest of State		X

[1]EPA designation replaces State designation.

Montana—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Entire State		X

(Sec. 110 of the Clean Air Act as amended)

[43 FR 8964, Mar. 3, 1978, as amended at 43 FR 40427, Sept. 11, 1978; 45 FR 59317, Sept. 9, 1980; 45 FR 62985, Sept. 23, 1980]

§ 81.328 Nebraska.

Nebraska—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
AQCR 085 (Douglas and Sarpy Counties):				
Douglas County:				
Omaha—24th and O Street site [1]	X			
Omaha—11th and Nicholas Street site [1]	X			
Remainder of Omaha		X		
Remainder of Douglas County				X
Sarpy County:				
Bellevue		X [2]		
Remainder of Sarpy County				X
AQCR 086			X [2]	
AQCR 145				X
AQCR 146:				
Cass County:				
Louisville (municipal boundaries)	X			
Weeping Water (municipal boundaries)	X			
Remainder of Cass County			X [2]	
Dawson County			X [2]	

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Nebraska—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Remainder of AQCR 146				X

[1]As described in the State implementation plan.
[2]EPA designation replaces State designation.

Nebraska—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Entire State				X

Nebraska—O_3

Designated area	Does not meet primary standards	Cannot be classified	Better than national standard
Douglas and Sarpy Counties		X	
Remainder of State			X

Nebraska—CO

Designated area	Does not meet primary standards	Cannot be classified	Better than national standards
City of Lincoln:			
Antelope Creek basin [1]	X		
Rest of city of Lincoln		X	
City of Omaha	X		
Remainder of State			X

[1]As described in the State implementation plan.

Nebraska—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Entire State		

[43 FR 8964, Mar. 3, 1978, as amended at 46 FR 57046, Nov. 20, 1981; 47 FR 10210, Mar. 10, 1982]

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§ 81.329 Nevada.

Nevada—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
(Township Range):				
Las Vegas Valley (212) (15-24S, 56-64E)	X			
Carson Desert (101) (15-24.5N, 25-35E)	X			
Packard Valley (101A) (24.5-28N, 31-34E)				X
Winnemucca Segment (70) (34-38W, 34-41E)	X			
Lower Reese Valley (59) (27-32N, 42-48E)		X		
Gabbs Valley			X	
Fernley Area (76) (19-21N, 23-26E)	X			
Truckee Meadows (87) (17-20N, 18-21E)	X			
Mason Valley (108) (9-16N, 24-26E)	X			
San Emido Desert (22) (27-32N, 22-24E)			[1]X	
Colorado River Valley (213) (22-33S, 63-66E)			[1]X	
Steptoe Valley (179) (10-29N, 61-67E)			[1]X	
Clovers Area (64) (32-39N, 42-46E)		X		
Rest of State				X

[1]EPA designation replaces State designation.

Nevada—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
(Township Range):				
Steptoe Valley (179) (10-29N, 61-67E):				
Central	X			
Northern (area which is north of Township 21 North and within the drainage basin of the Steptoe Valley)			X	
Southern (area which is south of Township 15 North and within the drainage basin of the Steptoe Valley)			X	
Rest of State				X

[1]EPA designation replaces State designation.

Nevada—O_3

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Las Vegas Valley	X	
Truckee Meadows		X
Lake Tahoe Basin		X
Rest of State		X

Nevada—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Las Vegas Valley (212) (15-245, 56-64E)	X	
Truckee Meadows (87) (17-20N, 18-21E)	X	
Lake Tahoe Basin (90) (13-17N, 18-19E)	X	

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Nevada—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Rest of State		X

Nevada—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Entire State		X

[43 FR 8964, Mar. 3, 1978, as amended at 45 FR 30071, May 7, 1980; 45 FR 35327, May 27, 1980; 45 FR 46807, July 11, 1980; 46 FR 14892, Mar. 3, 1981; 46 FR 37897, July 23, 1981; 47 FR 20773, May 14, 1982]

§ 81.330 New Hampshire.

New Hampshire—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Metropolitan Keene				X
Metropolitan Manchester		X		X
Remainder of New Hamsphire portion of So. N.H.M.V. AQCR 121				X
Central N.H. Intrastate AQCR 149				X
Metropolitan Berlin	[1]X			
Remainder of N.H. portion of Androscoggin Valley Interstate AQCR 107				

[1]EPA designation replaces State designation.

New Hampshire—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
N.H. portion of Merrimack Valley So. N.H. Interstate AQCR 121				X
Central N.H. Intrastate AQCR 149				X
Metropolitan Berlin	[1]X			
Remainder of N.H. portion of Androscoggin Valley Interstate AQCR 107				X

[1]EPA designation replaces State designation.

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New Hampshire—O_3

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Central N.H. Intrastate AQCR 149		X
N.H. portion of Androscoggin Valley Interstate AQCR 107		X
N.H. portion of Merrimack Valley So. N.H. Interstate AQCR 121	X	

New Hampshire—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
City of Manchester	X	
Nashua	X	
Remainder of N.H. portion of Merrimack Valley So. N.H. Interstate AQCR 121		X
Central N.H. Interstate AQCR 149		X
N.H. portion of Androscoggin Valley AQCR 107		X

New Hampshire—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Statewide		X

[43 FR 8964, Mar. 3, 1978, as amended at 45 FR 24877, Apr. 11, 1980; 46 FR 33542, June 30, 1981; 47 FR 764, Jan. 7, 1982]

§ 81.331 New Jersey.

New Jersey—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
New Jersey-New York-Connecticut Interstate AQCR:				
The City of Jersey City		X	X	
Remainder of Hudson County		X		
The City of Newark (east of the Garden State Pkwy.)		X		
The City of Elizabeth		X		
The City of Linden		X		
The Borough of Carteret		X		
The Township of Woodbridge		X		
The City of Perth Amboy		X		
Remainder of AQCR				X
Metropolitan Philadelphia Interstate AQCR:				
The City of Camden		X	X	
Remainder of AQCR				X
New Jersey Intrastate AQCR:				
The City of Bridgeton		X		
Remainder of AQCR				X
Northeast Pennsylvania-Upper Delaware Valley Interstate AQCR				X

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New Jersey—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
New Jersey-New York-Connecticut Interstate AQCR				X
Metropolitan Philadelphia Interstate AQCR				X
New Jersey Intrastate AQCR				X
Northeast Pennsylvania-Upper Delaware Valley Interstate AQCR				X

New Jersey—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
New Jersey-New York-Connecticut Interstate AQCR:		
The City of Paterson	X	
The City of Hackensack	X	
The City of Jersey City	X	
The City of Newark	X	
The City of Elizabeth	X	
The Town of Morristown	X	
The City of Perth Amboy	X	
The Borough of Somerville	X	
The City of Asbury Park	X	
The Borough of Freehold	X	
Remainder of AQCR		X
Metropolitan Philadelphia Interstate AQCR:		
The City of Trenton	X	
The City of Burlington	X	
The City of Camden	X	
The Borough of Penns Grove	X	
Remainder of AQCR		X
New Jersey Intrastate AQCR:		
The City of Atlantic City	X	
Toms River (portion of Dover Township)	X	
Remainder of AQCR		X
Northeast Pennsylvania-Upper Delaware Valley Interstate AQCR		X

New Jersey—O_x

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
New Jersey-New York-Connecticut Interstate AQCR	X	
Metropolitan Philadelphia Interstate AQCR	X	
New Jersey Intrastate AQCR	X	
Northeast Pennsylvania-Upper Delaware Valley Interstate AQCR	X	

New Jersey—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
New Jersey-New York-Connecticut Interstate AQCR		X
Metropolitan Philadelphia Interstate AQCR		X
New Jersey Intrastate AQCR		X

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New Jersey—NO_x

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Northeast Pennsylvania-Upper Delaware Interstate AQCR		X

[44 FR 5123, Jan. 25, 1979]

§ 81.332 New Mexico.

New Mexico—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
AQCR 012:				
Portion of Grant County	X			
Remainder of AQCR				X
AQCR 014				X
AQCR 152:				
Portions of City of Albuquerque	X			
Remainder of AQCR				X
AQCR 153				X
AQCR 154				X
AQCR 155:				
Portions of Eddy and Lea Counties near industries	X	X		
Remainder of AQCR				X
AQCR 156				X
AQCR 157				X

New Mexico—SO_x

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
AQCR 012:				
Portions of Grant County	X			
Remainder of AQCR				X
AQCR 014:				
Portions of San Juan County	X			
Remainder of AQCR				X
AQCR 152				X
AQCR 153				X
AQCR 154				X
AQCR 155				X
AQCR 156				X
AQCR 157				X

New Mexico—O_x

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 012		[1]X
AQCR 014		X

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New Mexico—O_x

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 152:		
Portion of Bernalillo County		[1]X
Remainder of AQCR		[1]X
AQCR 153		[1]X
AQCR 154		[1]X
AQCR 155		[1]X
AQCR 156		[1]X
AQCR 157		[1]X

[1]EPA designation replaces State designation.

New Mexico—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 012		X
AQCR 014:		
Central Farmington		X
Remainder of AQCR		X
AQCR 152:		
Bernalillo Co	X	
Remainder of AQCR		X
AQCR 153:		
Narrow Corridor in Las Cruses	X	
Remainder of AQCR		X
AQCR 154		X
AQCR 155		X
AQCR 156		X
AQCR 157:		
Narrow Corridor in Santa Fe		X
Remainder of AQCR		X

[1]EPA designation replaces State designation.

New Mexico—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 012		X
AQCR 014		X
AQCR 152		X
AQCR 153		X
AQCR 154		X
AQCR 155		X
AQCR 156		X
AQCR 157		X

[43 FR 8964, Mar. 3, 1978, as amended at 43 FR 40428, Sept. 11, 1978; 46 FR 31886, June 18, 1981; 46 FR 33031, June 26, 1981; 47 FR 19137, May 4, 1982]

EFFECTIVE DATE NOTE: At 47 FR 19137, May 4, 1982, effective July 6, 1982, the designation for "Portion of Bernalillo County" in the table "New Mexico—O_x" was changed from "does not meet primary standards" to "cannot be classified or better than national standards."

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§ 81.333 New York.

New York—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Niagara Frontier AQCR:				
The City of Buffalo (south of I-190; except an area one-half mile inland and parallel to Fuhrman Blvd. between I-190 and Tifft Street)	X			
The City of Buffalo (south of Genesee St; except an area one-quarter mile wide bordering Lake Erie and parallel to Fuhrman Blvd. between I-190 and Tifft Street)		X		
The City of Lackawanna	X	X		
The City of Tonawanda				X
The Town of Tonawanda				X
The City of Niagara Falls (south of Pine Ave., east of Hyde Park Blvd., and west of I-190)	X			
The City of Niagara Falls		X		
The Town of Niagara		X		
The City of North Tonawanda				X
The Village of Blasdell		X		
The Town of Cheektowaga (south of Genesee Rd. and west of Union Rd.)		X		
The Town of West Seneca				X
The City of Lockport (north of Rtes. 93 and 31)		X		
Remainder of AQCR				X
Genesee-Finger Lakes AQCR				X
Southern Tier West AQCR				X
Southern Tier East AQCR				X
Central AQCR:				
The City of Syracuse		X		
The Village of East Syracuse		X		
The Village of Solvay		X		
Remainder of AQCR				X
Northern (Champlain Valley) AQCR				X
Hudson Valley AQCR:				
The City of Albany (east of Rt. 32 and south of Rt. 20)		X		
The Town of Catskill (east of Rte. 9W and south of Embought Rd.)		X		
Remainder of AQCR				X
New Jersey-New York-Connecticut Interstate AQCR:				
The Borough of Manhattan		X	[1]X	
The Boroughs of the Bronx, Brooklyn, and Queens (south of the Cross Bronx Expressway, west of the Hutchinson River Parkway and Bronx-Whitestone Bridge, west of the Whitestone Expressway, west of the Van Wyck Expressway, north of the Southern Parkway, north of Conduit Blvd., north of Linden Blvd., north of Caton Ave., north of the Ft. Hamilton Parkway, and north of 39th Street)		X	[1]X	
The Borough of Staten Island (south of I-278, west of Richmond Ave., and north of Arthur Kill Road as far west as Rossville Ave.)			[1]X	
Remainder of AQCR				X

[1]EPA designation replaces State designation.

New York—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Niagara Frontier AQCR:				
The City of Buffalo (an area bounded on the north by Tifft Street, on the east by Hopkins Street, on the south by the City of Lackawanna and on the west by Lake Erie)	X			
The City of Lackawanna (west of South Park Avenue)	X			

BEST DOCUMENT AVAILABLE

New York—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Remainder of AQCR				X
Genesee-Finger Lakes AQCR				X
Southern Tier West AQCR				X
Southern Tier East AQCR				X
Central AQCR				X
Northern (Champlain Valley) AQCR				X
Hudson Valley AQCR				X
New Jersey-New York-Connecticut Interstate AQCR:				
The Borough of Manhattan (except between 59th and 125th Sts.)			X	
The Boroughs of Brooklyn and Queens (south of the Queensborough Bridge and Queens Blvd., west of 44th St., west of I-278, and north of the Brooklyn Bridge.)			X	
The Borough of the Bronx (south of I-95 and west of I-278)			X	
Remainder of AQCR				X

New York—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Niagara Frontier AQCR		X
Genesee-Finger Lakes AQCR		X
Southern Tier West AQCR		X
Southern Tier East AQCR		X
Central AQCR:		
The City of Syracuse (an area bounded by No. Salina St., Kirkpatrick St., Lodi St., Butternut St., Park St., DeWitt St., Sedgwick St., Robinson St., Sherwood Ave., Burnet Ave., the City line, East Genesee St., Basset St., Madison St., Comstock Ave., Jamesville Ave., the City Line, Erie-Lackawanna Railroad tracks, Glen Ave., I-81, Rte. 173, the City line, South Ave., Onondaga Ave., Bellevue Ave., Geddes St., I-690, Rte. 298, I-81, and Wolf St.)	[1]X	
Remainder of AQCR		X
Northern (Champlain Valley) AQCR		X
Hudson Valley AQCR:		
The Town of Waterford	X[1]	
The Town of Colonie (inside an area bounded by Sand Creek Road, Wolf Road, Railroad Ave., and Fuller Road)	X[1]	
The City of Schenectady	X[1]	
Remainder of AQCR		X
New Jersey-New York-Connecticut Interstate AQCR:		
The Borough of Manhattan (midtown: south of 60th St. and north of 30th St., exclusive of the West Side Highway and areas west, and FDR Drive and areas east; and downtown: south of Canal St., exclusive of the West Side Highway and areas west, and FDR Drive and areas east)	X	
The Borough of Manhattan (remainder)	[1]X	
The Borough of Staten Island (northeast section and southern half as defined by the Tri-State Regional Planning Commission as Traffic Analysis Zones 17 and 18)	X	
The Borough of Queens	[1]X	
The Borough of Brooklyn	[1]X	
The Borough of the Bronx	[1]X	
The City of Yonkers	[1]X	
The City of Mt. Vernon	[1]X	
Nassau County (south of the Long Island Expressway, west of the Oyster Bay Expressway, and north of the Southern State Parkway)	[1]X	
Remainder of AQCR		X

[1]EPA designation replaces State designation.

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New York—Ozone

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Niagara Frontier	X	
Genesee-Finger Lakes AQCR	X	
Southern Tier West AQCR		X
Southern Tier East AQCR		X
Central AQCR:		
The County of Cayuga	X	
The County of Onondaga	X	
Remainder of AQCR		X
Northern AQCR		X
Hudson Valley AQCR:		
The County of Albany	X	
The Town of Clifton Park	X	
The County of Columbia	X	
The County of Dutchess	X	
The County of Greene	X	
The Town of Halfmoon	X	
The City of Mechanicville	X	
The County of Orange	X	
The County of Putnam	X	
The County of Rensselaer	X	
The County of Schenectady	X	
The County of Ulster	X	
The Town of Waterford	X	
Remainder of AQCR		X
Metropolitan AQCR	X	

New York—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Niagara Frontier AQCR		X
Genesee-Finger Lakes AQCR		X
Southern Tier West AQCR		X
Southern Tier East AQCR		X
Central AQCR		X
Northern (Champlain Valley) AQCR		X
Hudson Valley AQCR		X
New Jersey-New York-Connecticut Interstate AQCR		X

(Secs. 107(d), 171(2), and 301(a) of the Clean Air Act (42 U.S.C. 7407(d), 7501(2), and 7601(a)))

[44 FR 5125, Jan. 25, 1979, as amended at 44 FR 70437, Dec. 7, 1979; 46 FR 8496, Jan. 27, 1981; 46 FR 11813, Feb. 11, 1981; 46 FR 12496, Feb. 17, 1981; 46 FR 14892, Mar. 3, 1981; 46 FR 47454, Sept. 28, 1981; 47 FR 1122, Jan. 11, 1982]

§ 81.334 North Carolina.

North Carolina—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Alamance County				X
Alexander County				X

BEST DOCUMENT AVAILABLE

North Carolina—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Alleghany County				X
Anson County				X
Ashe County				X
Avery County				X
Beaufort County				X
Bertie County				X
Bladen County				X
Brunswick County				X
Buncombe County				X
Burke County				X
Cabarrus County				X
Caldwell County				X
Camden County				X
Carteret County				X
Caswell County				X
Catawba County				X
Chatham County				X
Cherokee County				X
Chowan County				X
Clay County				X
Cleveland County				X
Columbus County				X
Craven County				X
Cumberland County				X
Currituck County				X
Dare County				X
Davidson County				X
Davie County				X
Duplin County				X
Durham County				X
Edgecombe County				X
Forsyth County				X
Franklin County				X
Gaston County				X
Gates County				X
Graham County				X
Granville County				X
Greene County				X
Guilford County				X
Halifax County				X
Harnett County				X
Haywood County				X
Henderson County				X
Hertford County				X
Hoke County				X
Hyde County				X
Iredell County				X
Jackson County				X
Johnston County				X
Jones County				X
Lee County				X
Lenoir County				X
Lincoln County				X
McDowell County				X
Macon County				X
Madison County				X
Martin County				X
Mecklenburg County				X
Mitchell County				X
Montgomery County				X
Moore County				X
Nash County				X
New Hanover County				X
Northampton County				X
Onslow County				X
Orange County				X
Pamlico County				X

North Carolina—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Pasquotank County				X
Pender County				X
Perquimans County				X
Person County				X
Pitt County				X
Polk County				X
Randolph County				X
Richmond County				X
Robeson County				X
Rockingham County				X
Rowan County				X
Rutherford County				X
Sampson County				X
Scotland County				X
Stanly County				X
Stokes County				X
Surry County				X
Swain County				X
Transylvania County				X
Tyrrell County				X
Union County				X
Vance County				X
Wake County				X
Warren County				X
Washington County				X
Watauga County				X
Wayne County				X
Wilkes County				X
Wilson County				X
Yadkin County				X
Yancey County				X

North Carolina—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Alamance County				X
Alexander County				X
Alleghany County				X
Anson County				X
Ashe County				X
Avery County				X
Beaufort County				X
Bertie County				X
Bladen County				X
Brunswick County				X
Buncombe County				X
Burke County				X
Cabarrus County				X
Caldwell County				X
Camden County				X
Carteret County				X
Caswell County				X
Catawba County				X
Chatham County				X
Cherokee County				X
Chowan County				X
Clay County				X
Cleveland County				X
Columbus County				X
Craven County				X
Cumberland County				X

North Carolina—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Currituck County				X
Dare County				X
Davidson County				X
Davie County				X
Duplin County				X
Durham County				X
Edgecombe County				X
Forsyth County				X
Franklin County				X
Gaston County				X
Gates County				X
Graham County				X
Granville County				X
Greene County				X
Guilford County				X
Halifax County				X
Harnett County				X
Haywood County				X
Henderson County				X
Hertford County				X
Hoke County				X
Hyde County				X
Iredell County				X
Jackson County				X
Johnston County				X
Jones County				X
Lee County				X
Lenoir County				X
Lincoln County				X
McDowell County				X
Macon County				X
Madison County				X
Martin County				X
Mecklenburg County				X
Mitchell County				X
Montgomery County				X
Moore County				X
Nash County				X
New Hanover County				X
Northampton County				X
Onslow County				X
Orange County				X
Pamlico County				X
Pasquotank County				X
Pender County				X
Perquimans County				X
Person County				X
Pitt County				X
Polk County				X
Randolph County				X
Richmond County				X
Robeson County				X
Rockingham County				X
Rowan County				X
Rutherford County				X
Sampson County				X
Scotland County				X
Stanly County				X
Stokes County				X
Surry County				X
Swain County				X
Transylvania County				X
Tyrrell County				X
Union County				X
Vance County				X
Wake County				X
Warren County				X

North Carolina—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Washington County				X
Watauga County				X
Wayne County				X
Wilkes County				X
Wilson County				X
Yadkin County				X
Yancey County				X

North Carolina—O_3

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Mecklenburg County	X	
Rest of State		X

North Carolina—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Mecklenburg County	X	
Rest of State		X

North Carolina—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Statewide		X

(Secs. 107, 171, and 301 of the Clean Air Act (42 U.S.C. 7407, 7501, and 7601))

[43 FR 8964, Mar. 3, 1978, as amended at 43 FR 40430, Sept. 11, 1978; 44 FR 24846, Apr. 27, 1979; 44 FR 48680, Aug. 20, 1979; 46 FR 27934, May 22, 1981; 46 FR 36701, July 15, 1981; 46 FR 38508, July 28, 1981]

BEST DOCUMENT AVAILABLE

§ 81.335 North Dakota.

North Dakota—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Entire State				X

North Dakota—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Entire State				X

North Dakota—O_3

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Entire State		X

North Dakota—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Entire State		X

North Dakota—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Entire State		X

[43 FR 8964, Mar. 3, 1978, as amended at 43 FR 40431, Sept. 11, 1978]

§ 81.336 Ohio.

Ohio—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Allen		X		
Belmont:				
Cities of Martins Ferry, Bridgeport, Brookside, Bellaire, Shadyside & Powhatan Point in addition to Townships of Pease, Pultney, Mead & York	X			
Townships of Colerain, Richland, Smith & Washington excluding primary nonattainment areas		X		
The remainder of Belmont County				X
Butler:				
City of Middletown	X			
Cities of Monroe, Trenton, New Miami, Fairfield, and that portion of the City of Hamilton within Fairfield Township & also the Townships of Madison, Lemon, St. Clair, Liberty, Fairfield & Union		X		
The remainder of Butler County				X
Clark:				
The area south and east of the line determined by: Route 41 east from the Clark-Miami County Line east to Route 235, north to the Clark-Champaigne County Line; and bounded by the north-south line determined by: State Route 72 south to Interstate 70, Interstate 70 west to Old Mill Road, south to Fairfield Pike, northeast to Cross Road, east to Route 68, south to Jackson Road, east to Mosier Road, south to Clark-Greene County Line		X		
The remainder of Clark County				X
Clermont:				
The southern boundary being Concord Road (Twp Rd No. T-67). The western boundary being the Jenny Lind Road (Twp Rd No. T-202); north to Locust Lake Road (Twp Rd No. T-179); west to Lewis Road (Twp Rd No. T-178)			X	
The northern boundary being State Route 125 east to Amelia, Olive Branch Road. Then east again on Lucy Run Road (Twp Rd No. T-182); east again on Chapel Road (Twp Rd No. T-68)				
The eastern boundary is the Mt. Holly Lane Road excluding all portions of Monroe Township				
The remainder of Clermont County				X
All other counties in the State of Ohio				X
Columbiana:				
The Cities of East Palestine, East Liverpool & Wellsville, plus the Townships of Fairfield, Unity, Elk Run, Middleton, Madison, St. Clair, Liverpool & Yellow Creek	X			
Knox & West Townships				X
The remainder of Columbiana County		X		
Coshocton				X
Cuyahoga:				
The Cities of Brookly Hts., Cuyahoga Hts., Newburg Hts., Bratenahl & the City of Cleveland east of W. 117th St. & Highland Ave	X			
Olmsted & Chagrin Falls Townships & the Cities of Bay Village, Westlake, North Olmsted, Olmsted Falls, Strongsville, North Royalton, Broadview Hts., Brecksville, Glenwillow, Solon, Bentleyville, Grange, Moreland Hills, Chagrin Falls, Pepper Pike, Hunting Valley, Lyndhurst, Mayfield Hts., Highland Hts., Mayfield & Gates Mills				X
The remainder of Cuyahoga County		X		
Defiance				X
Franklin:				
Includes an area encompassed by Alum Creek on the east, Livingston Ave., Lockbourne Road, Thurman Ave., and Greenlawn Ave. on the south; on the west by I-71 & S.R. 315; & on the north by Lane Ave., North High St., Weber Road, Westerville Pike & Agler Road	X			
The area within I-270 outerbelt excluding primary nonattainment area		X		

BEST DOCUMENT AVAILABLE

Ohio—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
The remainder of Franklin County				X
Gallia		X		
Hamilton:				
The subarea bounded on the east by I-71, on the south by the Ohio River, on the west by the Cincinnati City Limits & on the north by the north & west boundaries of the Cities of Cincinnati, Lockland, Lincoln Hts., Evandale & Blue Ash	X			
Area south & east of U.S. 50 & north & east of S.R. 125, & an area to the north including the Cities of Forest Park, Greenhills, Mt. Healthy, North College Hill, Wyoming, Woodlawn, Glendale, Springdale, Sharonville & Loveland & the Townships of Colerain, Springfield, Sycamore & Symmes				X
The remainder of Hamilton County		X		X
Henry		X		
Jackson				
Jefferson:				
Cities of Stratton, Empire, Toronto, Wintersville, Steubenville, Mingo Junction, New Alexandria, Brilliant, Rayland, Tiltonville, Yorkville & Townships of Saline, Knox, Island Creek, Cross Creek, Steubenville, Wells & Warren	X			
Springfield Township				X
The remainder of Jefferson County		X		
Lake:				
The City of Painesville	X			
(a) Leroy Township, (b) the area bounded on the north and west by the county line, on the south by I-90 and on the east by S.R. 306, excluding the Town of Willowick, and (c) Painesville Township excluding Fairport Harbor and Grand River *and* the area within Painesville Township north and west of Fairport Harbor and Grand River		X		
Remainder of Lake County				X
Lawrence:				
The Cities of Ironton, Coal Grove & South Point & the Townships of Upper & Perry	X			
Fayette Township		X		
The remainder of Lawrence County				X
Logan	X			
Lorain:				
The City of Lorain bordered on the west by State Route 58; on the south by State Route 611, Elyria Avenue, and East 28th Street through to East River Road (Sheffield Elyria Road) and, on the east by East River Road (Sheffield Elyria Road), State Route 611, and Harris Road	X			
The City of Lorain, east of Route 58, the incorporated communities of Sheffield, Sheffield Lake, and Avon Lake plus the remainder of Sheffield Township excluding the primary TSP nonattainment area		X		
The remainder of Lorain County				X
Lucas:				
City of Toledo, east of the Maumee River	X			
The remainder of Lucas County				X
Madison				X
Mahoning:				
The Cities of Campbell, Struthers & Youngstown & that portion of Poland Township north of U.S.R. 224 & that portion of Coitsville Township south of U.S.R. 422	X			
Townships of Coitsville (excluding portion south of U.S.R. 422), Boardman & Poland (excluding portion north of U.S.R. 224) & that portion of Austintown Township east of S.R. 46		X		
The remainder of Mahoning County				X
Medina		X		
Miami:				
The City of Piqua	X			

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BEST DOCUMENT AVAILABLE

Ohio—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
That area in Miami County north of the line determined by Fenner Road from the Darke-Miami County line east to Pemberton Road, south to Horse Shoe Bend Road, east to Rte. 55, Rte. 55 northeast thru Troy to Troy Urbana Road, Troy-Urbana Road northeast to Miami-Champaigne County line & south of the line determined by Rte. 40 north from the Montgomery-Miami County line to Rte. 202, north to Rte. 571, east to Rte. 201, north to Rte. 41, east to the Miami-Clark County line & excluding the City of Piqua		X		
The remainder of Miami County				X
Monroe:				
The City of Clarington & the Townships of Salem & Switzerland	X			
Townships of Adams, Greene, Lee, Ohio & Sunbury		X		
The remainder of Monroe County				X
Montgomery:				
The Cities of Miamisburg & Dayton excluding that portion of the City of Dayton bounded by Patterson Rd., Spaulding Rd., Woodbine Av., and Smithville Rd	X			
That area in Montgomery Co. south & east of the following: Rte. 440 (U.S. 40) at the Montgomery-Miami County line south to Bridgewater Rd., south to Taylorsville Rd., west to Little York Rd., west to Peters Rd., south to Frederick Rd., northwest to Dog Leg Rd., southwest to Westbrook Rd., west to Olive Rd., south to Shiloh Springs Rd., west to Union Rd., south to Little Richmond Rd., west to Snyder Rd., south to Old Dayton Rd., west to Luther Church Rd., south to Mile Rd., west to Guntle Rd., south to Havermale Rd., west to Clayton Rd., south to Chicken Birskle Rd., west to Montgomery-Preble County Line. However, there is an attainment area within this nonattainment area which is described by the following boundaries: north on S.R. 48 from the Montgomery-Warren County Line to Whipp Road, east to Bigger Road, north to Wilmington Pike, northwest to Woodman Dr., north to Vale Dr., east to County Line Rd., north to Patterson Rd., west to Spaulding Rd., north to Woodbine Ave., west to Smithville Rd., south to Dorothy La., west to South Dixie Dr., southwest to I-75, south to the Montgomery-Warren County Line		X		
The remainder of Montgomery County				X
Muskingum		X		
Noble			X	
Preble:				
That area within Preble County southeast of the line described by: The Montgomery-Preble County Line Rd. at Spitler Rd., south to Kinsey Rd., west to S.R. 503, south to the Preble-Butler County Line		X		
The remainder of Preble County				X
Richland	X			
Ross			X	
Sandusky	X			
Scioto:				
The Cities of Portsmouth, New Boston & South Webster & Bloom Township	X			
Township of Harrison excluding primary nonattainment areas		X		
The remainder of Scioto County				X
Seneca:				
City of Bettsville and Liberty Township north of the Penn Central Railroad		X		
The remainder of Seneca County				X
Stark:				
Portions of the City of Canton to the south of 12th Ave	X			
The political boundaries of City of Canton & Canton Township excluding primary nonattainment areas		X		
The remainder of Stark County				X

BEST DOCUMENT AVAILABLE

Ohio—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Summit:				
Area encompassed on the north by S.R. 261, on the east by S.R. 91, on the south by U.S.R. 224 & on the west by S.R. 93	X			
Area bounded on the north by S.R. 18 from the Medina County line to the Fairlawn city limits, & the city limits of Fairlawn, Akron, Cuyahoga Falls & Stow; on the east by the Summit-Portage, Summit-Stark County lines; on the south by S.R. 619, S.R. 93 & the Summit-Stark County line; & on the west by the Summit-Wayne, Summit-Medina County lines, excluding primary nonattainment areas		X		
The remainder of Summit County				X
Trumbull:				
The area encompassed on the north by S.R. 82, on the east by S.R. 11, S.R. 304 & S.R. 616, on the south by the County line & on the west by the Mahoning River	X			
The Township of Warren, Howland, Weathersfield, Liberty & Hubbard; & of Vienna Township the area south of the north boundary of Vienna Township to S.R. 193 & the area of Brookfield Township south of S.R. 82 excluding primary nonattainment areas		X		
The remainder of Trumbull County				X
Tuscarawas		X		
Washington		X		
Wyandot		X		
All other counties in the State of Ohio				X

[1]EPA designation replaces State designation.

Ohio—Sulfur Dioxide

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Athens				X
Clermont:				
Pierce Township	[1]X			
The remainder of Clermont County				[1]X
Columbiana:				
Cities of East Palestine & East Liverpool & Unity Township	[1]X			
The remainder of Columbiana County				[1]X
Coshocton:				
Franklin Township	[1]X			
The remainder of Coshocton County				[1]X
Cuyahoga:				
The Cities of Bay Village, Westlake, North Olmsted, Olmsted Falls, Rock River, Fairview Park, Berea, Middleburg Hts., Strongsville, North Royalton, Broadview Hts., Brecksville and the Townships of Olmsted and Riveredge				X
The remainder of Cuyahoga County	X			
Gallia:				
Addison Township		[1]X		
The remainder of Gallia County				[1]X
Greene				X
Hamilton:				
The City of Cincinnati bounded on the west by I75 and U.S. Route 127, and on the south by the Ohio and Little Miami Rivers, the Cities of Norwood, Fairfax Silverton, Golf Manor, Amberly, Deer Park, Arlington Heights, Elwood Place, and St. Bernard				[1]X
The remainder of Hamilton County				[1]X
Jefferson:				
Cities of Steubenville & Mingo Junction, Townships of Steubenville, Island Creek, Cross Creek, Knox and Wells	[1]X			

BEST DOCUMENT AVAILABLE

Ohio—Sulfur Dioxide

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
The remainder of Jefferson County				[1]X
Lake:				
The Cities of Eastlake, Timberlake, Lakeline, Willoughby (north of U.S. 20), an Mentor (north of U.S. 20 west of S.R. 306)	X			
The remainder of Lake County				X
Lorain:				
The entire area north of Rte. 80 & the City of Elyria	[1]X			
The remainder of Lorain County				[1]X
Lucas:				
The area east of Rte. 23 & west of eastern boundary of Oregon Township	[1]X			
The remainder of Lucas County				[1]X
Mahoning				X
Montgomery				X
Morgan:				
Center Township		[1]X		
The remainder of Morgan Country				[1]X
Summit:				
Entire area northwest of the following line: Rte 80 east to Rte 91. Rte 91 north to county line and the entire area between the following lines: 1) Bath Rd. (48) east to Rte 8. Rte 8 north to Barlow Rd. (I-121). Barlow Rd. east to county boundary. 2) Vanderhoof Rd. (215) east to Rte 93. Rte 93 north to Rte 619. Rte 619 east to county boundary	[1]X			
The remainder of Summit County				[1]X
Trumbull				X
Washington:				
Waterford Township		X		
The remainder of Washington County				X
All other counties in the State of Ohio				[1]X

[1]EPA designation replaces State designation.

Ohio—O_x

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Adams		X
Allen	X	
Ashland	X	
Ashtabula	X	
Athens		X
Auglaize		X
Belmont	X	
Brown	X	
Butler	X	
Carroll	X	
Champaign	X	
Clark	X	
Clermont	X	
Clinton	X	
Columbiana	X	
Coshocton		X
Crawford		X
Cuyahoga	X	
Darke	X	
Defiance		X
Delaware	X	
Erie	X	
Fairfield	X	
Fayette	X	
Franklin	X	

BEST DOCUMENT AVAILABLE

Ohio—O_x

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Fulton	X	
Gallia		X
Geauga	X	
Greene	X	
Guernsey		X
Hamilton	X	
Hancock	X	
Hardin		X
Harrison	X	
Henry	X	
Highland	X	
Hocking	X	
Holmes	X	
Huron	X	
Jackson		X
Jefferson	X	
Knox	X	
Lake	X	
Lawrence	X	
Licking	X	
Logan	X	
Lorain	X	
Lucas	X	
Madison	X	
Mahoning	X	
Marion	X	
Medina	X	
Meigs		X
Mercer		X
Miami	X	
Monroe		X
Montgomery	X	
Morgan		X
Morrow	X	
Muskingum		X
Noble		X
Ottawa	X	
Paulding		X
Perry	X	
Pickaway	X	
Pike		X
Portage	X	
Preble	X	
Putnam		X
Richland	X	
Ross	X	
Sandusky	X	
Scioto		X
Seneca	X	
Shelby	X	
Stark	X	
Summit	X	
Trumbull	X	
Tuscarawas	X	
Union	X	
Van Wert		X
Vinton		X
Warren	X	
Washington		X
Wayne	X	
Williams		X
Wood	X	
Wyandot		X

Ohio—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Cuyahoga	X	
Franklin	X	
Hamilton	X	
Jefferson	X	
Lucas		X
Mahoning	X	
Montgomery	X	
Summit		X
All portions of all other counties in State of Ohio		X

Ohio—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
State of Ohio		X

(Secs. 107(d), 171(2), 301(a) of the Clean Air Act as amended (42 U.S.C. 7407(d), 7501(2), 7601(a)))

[43 FR 46011, Oct. 5, 1978]

NOTE: For Federal Register citations affecting § 81.336, see List of CFR Sections Affected in the Finding Aids section of this volume.

EFFECTIVE DATE NOTE: At 47 FR 25017, June 9, 1982, effective Aug. 9, 1982, the following counties were removed from the chart for TSP: Ashtabula, Clinton, Meigs, Carroll, Champaigne, Darke, Geauga, Greene, Hancock, Portage, Shelby, Wayne and Wood. The references to Lucas and Seneca were revised. For the convenience of the user, the superseded text appears below.

§ 81.336 Ohio.

Ohio—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Ashtabula, City of Ashtabula, Ashtabula Township & portion of Plymouth Township north of I-90	X			
The remainder of Ashtabula County				X
• • • •	•	•	•	•
Carroll		X		
Champaigne		X		
• • • •	•	•	•	•
Clinton	X			

BEST DOCUMENT AVAILABLE

Ohio—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
• • • •	•		•	•
Darke:				
The subareas defined as north of the line formed by Road T358 east from the Indiana-Ohio line to Richmont Road, south to Moore Road, east to Payne Road, south to Rush Road, east to and thru New Madison (emerging as Wilt Road east of New Madison), east from New Madison on Wilt Road to Preble County Butler Township Road, north to Hollandsburg-Arcanum Road, east to Jaysville-St. John's Road, north to Delisle-Fourman's Road, east to Gordon Landis Road, north to Painter Creek-Arganun Road, east to Teagues-South Road, south to Delisle-Fourman's Road, east to Darke-Miami County line (where road becomes Fenner Road)		X		
The remainder of Darke County				X
• • • •	•		•	•
Geauga		X		
Greene:				
Includes those areas west of the line determined by the following: Meredith Rd. south from the Greene-Clark County Line, converts to S.R. 370, south to Bryan Park Rd., southeast to Clifton Rd., southwest to Rte. 68, south to Rte. 235, northwest to Hill Top Rd., southwest to Fairground Rd., west to Beaver Valley Rd., south to Lantz Rd., west to Fairfield Rd., south to Sweigart Rd., southwest to Little Sugarcreek Rd., south on Little Sugarcreek Rd. to Feed Wire Rd., east on Feed Wire Rd. to Mead Rd., south on Mead Rd. to Mill Rd., follow Mill Rd. south, then east to Lower Bellbrook Rd., Lower Bellbrook Rd. northeast to Schnebly Rd., Schnebly Rd. southeast, then south to S.R. 725, follow S.R. 725 east to the residential area of Spring Valley and take road which becomes Spring Valley-Paintersville Rd. through residential area to Cornstalk Rd., Cornstalk Rd. south to Greene-Warren County Line		X		
The remainder of Greene County				X
• • • •	•		•	•
Hancock				X
• • • •	•		•	•
Lucas:				
The Cities of Toledo & Maumee	X			
Townships of Waterville, Monclova & Washington		X		
The remainder of Lucas County				X
• • • •	•		•	•
Portage		X		
• • • •	•		•	•
Seneca		X		
• • • •	•		•	•
Shelby		X		
• • • •	•		•	•
Wayne		X		
• • • •	•		•	•
Wood		X		

BEST DOCUMENT AVAILABLE

§ 81.337 Oklahoma.

Oklahoma—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
AQCR 017				X
AQCR 184:				
Portions of Oklahoma County	X	X		
Remainder of Oklahoma County			X	
Remainder of AQCR				X
AQCR 185				X
AQCR 186:				
Portions of Tulsa County	X	X		
Remainder of Tulsa County			X	
Portions of Muskagee County			X	
Portions of Mayes County	[1]X			
Remainder of AQCR				X
AQCR 187				X
AQCR 188				X
AQCR 189:				
Portion of Comanche County			X	
Remainder of AQCR				X

[1] EPA designation replaces State designation.

Oklahoma—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
AQCR 017				X
AQCR 184				X
AQCR 185				X
AQCR 186				X
AQCR 187				X
AQCR 188				X
AQCR 189				X

Oklahoma—O_3

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 017		X
AQCR 184:		
Oklahoma Co	X	
Cleveland Co		X
Remainder of AQCR		X
AQCR 185		X
AQCR 186:		
Tulsa Co	X	
Remaining counties in AQCR		X
AQCR 187		X
AQCR 188		X
AQCR 189		X

BEST DOCUMENT AVAILABLE

Oklahoma—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 017		X
AQCR 184		X
AQCR 185		X
AQCR 186		
Portion of Tulsa Co	[1]X	
Remainder of AQCR		X
AQCR 187		X
AQCR 188		X
AQCR 189		X

[1]EPA designation replaces State designation.

Oklahoma—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 017		X
AQCR 184		X
AQCR 185		X
AQCR 186		X
AQCR 187		X
AQCR 188		X
AQCR 189		X

[43 FR 8964, Mar. 3, 1978, as amended at 43 FR 40431, Sept. 11, 1978; 45 FR 73930, Nov. 7, 1980; 46 FR 31014, June 12, 1981]

§ 81.338 Oregon.

Oregon—TSP

Designated area	Does not meet primary standard	Does not meet secondary standard	Cannot be classified	Better than national standards
Portland-Vancouver AQMA (portions of the Oregon portion)		X		
Eugene-Springfield AQMA		X		
Medford-Ashland AQMA	X			
Remainder of State				X

BEST DOCUMENT AVAILABLE

Oregon—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Entire State				X

Oregon—Ozone

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Portland-Vancouver AQMA (Oregon portion)	X	
Medford-Ashland AQMA	X	
Salem	X	
Eugene-Springfield AQMA		X
Remainder of State		X

Oregon—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Portland-Vancouver AQMA (Oregon portion)	X	
Eugene-Springfield AQMA	X	
Medford-Ashland AQMA	X	
City of Salem	X	
Remainder of State		X

Oregon—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Entire State		X

(Secs. 107(d), 171(2), 301(a), of the Clean Air Act, as amended (42 U.S.C. 7407(d), 7501(2), 7601(a)))

[43 FR 8964, Mar. 3, 1978, as amended at 45 FR 2045, Jan. 10, 1980; 47 FR 15588, Apr. 12, 1982]

BEST DOCUMENT AVAILABLE

§ 81.339 Pennsylvania.

Pennsylvania—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than National standards
I. Metropolitan Philadelphia Interstate AQCR:				
(A) City of Philadelphia:				
Census tracts 1-12, 125-142, 144-157, 162-177, 190-205, 293, 294, 298-302, 315-321, 323, 325, 328, 329-332		X		
Census tracts 13-75, 143, 158-161, 178-189, 295-297, 322, 324, 327			X	
Balance of City				X
(B) Montgomery County:				
Conshohocken Boro		X		
West Conshohocken Boro			X	
Lower Merion Boro			X	
Narberth Boro			X	
Upper Merion Twp			X	
Bridgeport Boro			X	
Norristown Boro			X	
Plymouth Twp			X	
Whitemarsh Twp			X	
Lansdale Boro				X
Pottstown Boro		X		
Upper Moreland Twp			X	
Lower Pottsgrove Twp			X	
Upper Providence Twp			X	
(C) Chester County:				
South Coatesville Boro		X		
City of Coatesville			X	
Caln Twp			X	
Downingtown Boro			X	
East Fallowfield Twp			X	
Modena Boro			X	
Valley Twp			X	
North Coventry Twp			X	
East Coventry Twp			X	
Phoenixville Boro		X		
Schuylkill Twp			X	
(D) Bucks County:				
Doylestown Twp			X	
(E) Remaining Pennsylvania Portion of AQCR				X
II. Northeast Pennsylvania Interstate AQCR:				
(A) Allentown, Bethlehem, Easton Air Basin	X			
(B) Reading Air Basin		X		
(C) Scranton, Wilkes Barre Air Basin		X		
(D) Remaining Pennsylvania Portion of AQCR				X
III. South Central Pennsylvania Intrastate AQCR:				
(A) Lancaster Air Basin	X			
(B) Harrisburg Air Basin		X		
(C) York Air Basin	X			
(D) Remainder of AQCR				X
IV. Central Pennsylvania Intrastate AQCR:				
(A) Johnstown Air Basin	X			
(B) Lycoming County:				
City of Williamsport		X		
South Williamsport Boro			X	
Duboistown Boro			X	
Armstrong Twp			X	
Susquehanna Twp			X	
Woodward Twp			X	
Old Lycoming Twp			X	
Loyalsock Twp			X	
Montoursville Boro			X	
(C) Blair County:				
City of Altoona		X		
Logan Twp			X	
Allegheny Twp			X	
(D) Remainder of AQCR				X

Pennsylvania—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than National standards
V. Southwest Pennsylvania Interstate AQCR:				
(A) Monongahela Valley Air Basin	X			
(B) Allegheny County Air Basin				
(1) A three mile wide strip which is within a perpendicular distance two miles north and east and one mile south and west of the river center line with terminus points as follows:				
(a) The Beaver County line to the I-79 Bridge on the Ohio River			X	
(b) I-79 Bridge to the McKees Rocks Bridge on the Ohio River	X			
(c) McKees Rocks Bridge to the Birmingham Bridge on the Ohio and Monongahela Rivers	X			
(d) Birmingham Bridge to the Glenwood Bridge on the Monongahela River	X			
(e) Glenwood Bridge to the Mansfield Bridge (Dravosburg) on the Monongahela River	X			
(f) Mansfield Bridge to the Westmoreland County line on the Monongahela River	X			
(2) The area within a half-mile radius of the Greater Pittsburgh Airport monitor	X			
(3) The one mile wide strip centered on Turtle Creek running from area (V)(B)(1)(e) above to the Westmoreland County line	X			
(4) The area within Allegheny County within a radius of two miles of the Springdale monitor		X		
(5) The remaining portions of the Allegheny County Air Basin				X
(C) Beaver Valley Air Basin	X			
(D) Remainder of AQCR				X
VI. Northwest Pennsylvania Interstate AQCR:				
(A) Erie Air Basin	X			
(B) Mercer County:				
City of Sharon	X			
City of Farrell	X			
Hickory Twp			X	
Sharpsville Boro			X	
Wheatland Boro			X	
(C) Beaver Valley Air Basin	X			
(D) Remaining Pennsylvania Portion of AQCR				X

Pennsylvania—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
I. Metropolitan Philadelphia Interstate AQCR:				
(A) City of Philadelphia				X
(B) Delaware County				X
(C) Remaining Pennsylvania Portion of AQCR				X
II. Northeast Pennsylvania Intrastate AQCR				X
III. South Central Pennsylvania Intrastate AQCR				X
IV. Central Pennsylvania Intrastate AQCR:				
(A) Northumberland County:				
Lower Augusta Twp	X			
Point Twp	X			
Little Mahanoy Twp		X		
Rockefeller Twp		X		
Shamokin Twp		X		
Upper Augusta Twp			X	
Sunbury Boro			X	
Northumberland Boro			X	

BEST DOCUMENT AVAILABLE

Pennsylvania—SO_x

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
(B) Snyder County:				
Shamokin Dam	X			
Monroe Twp			X	
(C) Remainder of AQCR				X
V. Southwest Pennsylvania Intrastate AQCR:				
(A) Monongahela Valley Air Basin			X	
(B) Allegheny County Air Basin:				
(1) The area within a two-mile radius of the Hazelwood monitor	X			
(2) That portion of Allegheny County within an eight-mile radius of the Dusquesne Golf Association Club House in West Mifflin excluding the non-attainment area (#1)			X	
(3) The area within a two-mile radius of the Bellevue monitor			X	
(4) The remaining portions of the Allegheny County Air Basin				X
(C) Beaver Valley Air Basin (Beaver County)	X			
(D) Armstrong County:				
Madison Twp	X			
Mahoning Twp	X			
Boggs Twp	X			
Washington Twp	X			
Pine Twp	X			
(E) Remainder of AQCR				X
VI. Northwest Pennsylvania Interstate AQCR:				
(A) Warren County:				
Conewago Twp	X			
Warren Boro			X	
Mead Twp			X	
Clarendon Boro			X	
Pleasant Twp			X	
(B) Beaver Valley Air Basin (Lawrence County)			X	
(C) Remaining Pennsylvania Portion of the AQCR				X

Pennsylvania—O_x

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Entire State	X	

Pennsylvania—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
City of Philadelphia—high traffic density areas within the CBD and certain other high traffic density areas	X	
Allegheny County Air Basin—high traffic density areas within the CBD and certain other high traffic density areas	X	
Remainder of State		X

BEST DOCUMENT AVAILABLE

Pennsylvania—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Entire State		X

(Secs. 107(d), 171(2), 301(a), Clean Air Act, as amended (42 U.S.C. 7407(d), 7501(2), 7601(a)))

[43 FR 40513, Sept. 12, 1978, as amended at 45 FR 9264, Feb. 12, 1980; 45 FR 19555, Mar. 26, 1980; 45 FR 72159, Oct. 31, 1980; 46 FR 51612, Oct. 21, 1981; 47 FR 21793, May 20, 1982]

EFFECTIVE DATE NOTE: At 47 FR 21793, May 20, 1982, effective July 19, 1982, the entry for "City of Philadelphia" in the table "Pennsylvania—SO_2" was revised. For the convenience of the user, the superseded text appears below.

§ 81.339 Pennsylvania.

* * * * *

Pennsylvania—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
I. Metropolitan Philadelphia Interstate AQCR:				
(A) City of Philadelphia:				
Census tracts 2, 3, 4, 5, 6, 7, 8, 9, 11, 12	X			
Balance of City				X
* * * * * * *				

§ 81.340 Rhode Island.

Rhode Island—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Providence	X			
East Providence, Cranston, Warwick, North Providence, Pawtucket, and Central Falls			X	
Remainder of Rhode Island portion of AQCR 120				X

BEST DOCUMENT AVAILABLE

Rhode Island—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Rhode Island portion of AQCR 120				X

Rhode Island—O_3

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Rhode Island portion of AQCR 120	X	

Rhode Island—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Providence	X	
Remainder of Rhode Island portion of AQCR 120		X

Rhode Island—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Rhode Island portion of AQCR 120		X

[43 FR 8964, Mar. 3, 1978, as amended at 46 FR 25461, May 7, 1981]

§ 81.341 South Carolina.

South Carolina—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Abbeville County				X
Aiken County				X
Allendale County				X
Anderson County				X
Bamberg County				X
Barnwell County				X
Beaufort County				X
Berkeley County				X
Calhoun County				X
That portion of Charleston County within section of Charleston just west of south end of US Naval Station	X	X		
Portions of Charleston County not otherwise designated				X
Cherokee County				X
Chester County				X

BEST DOCUMENT AVAILABLE

South Carolina—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Chesterfield County				X
Clarendon County				X
Colleton County				X
Darlington County				X
Dillon County				X
Dorchester County				X
Edgefield County				X
Fairfield County				X
Florence County				X
That portion of Georgetown County within southern section of Georgetown	X	X		
Portions of Georgetown County not otherwise designated				X
Greenville County				X
Greenwood County				X
Hampton County				X
Horry County				X
Jasper County				X
Kershaw County				X
Lancaster County				X
Laurens County				X
Lee County				X
Lexington County				X
McCormick County				X
Marion County				X
Marlboro County				X
Newberry County				X
Oconee County				X
Orangeburg				X
Pickens County				X
Richland County				X
Saluda County				X
Spartanburg County				X
Sumter County				X
Union County				X
Williamsburg County				X
York County				X

South Carolina—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Abbeville County				X
Aiken County				X
Allendale County				X
Anderson County				X
Bamberg County				X
Barnwell County				X
Beaufort County				X
Berkeley County				X
Calhoun County				X
Charleston County				X
Cherokee County				X
Chester County				X
Chesterfield County				X
Clarendon County				X
Colleton County				X
Darlington County				X
Dillon County				X
Dorchester County				X
Edgefield County				X
Fairfield County				X
Florence County				X

South Carolina—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Georgetown County				X
Greenville County				X
Greenwood County				X
Hampton County				X
Horry County				X
Jasper County				X
Kershaw County				X
Lancaster County				X
Laurens County				X
Lee County				X
Lexington County				X
McCormick County				X
Marion County				X
Marlboro County				X
Newberry County				X
Oconee County				X
Orangeburg County				X
Pickens County				X
Richland County				X
Saluda County				X
Spartanburg County				X
Sumter County				X
Union County				X
Williamsburg County				X
York County				X

South Carolina—O_x

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Charleston Area—Charleston and Berkeley Counties	[1]X	
Columbia Area—Richland and Lexington Counties	[1]X	
York County	[1]X	
Rest of State		X

[1]EPA designation replaces State designation.

South Carolina—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
That portion of Richland County within city limits of Columbia	X	
Rest of State		X

90-128 O—82——11

South Carolina—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Statewide		X

(Secs. 110, and 172 of the Clean Air Act (42 U.S.C. 7410 and 7502))

[43 FR 8964, Mar. 3, 1978, as amended at 45 FR 6576, Jan. 29, 1980; 46 FR 53416, Oct. 29, 1981; 47 FR 952, Jan. 8, 1982]

§ 81.342 South Dakota.

South Dakota—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Rapid City Area	X			
Rest of State				X

BEST DOCUMENT AVAILABLE

South Dakota—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Entire State				X

South Dakota—O_x

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Entire State		X

South Dakota—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Entire State		X

South Dakota—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Entire State		X

§ 81.343 Tennessee.

Tennessee—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Those portions of Campbell County within downtown Lafollette and the area surrounding the Carborundum Company's plant at Jacksboro	X	X		
That portion of Davidson County within the 1964 Urban Services Area of Nashville	X	X		
That portion of Hamilton County within approximately the city limits of Chattanooga	X	X		
That portion of Knox County within a section of downtown Knoxville			X	
That portion of Maury County within the northern section of downtown Columbia	X	X		
That portion of Maury County within the remainder of the northern section of Columbia			X	
That portion of Obion County within the downtown section of Union City			X	

BEST DOCUMENT AVAILABLE

Tennessee—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
That portion of Roane County within a downtown section of Rockwood			X	
Those portions of Shelby County within two sections of downtown Memphis	X	X		
Those portions of Sullivan County within a section of Bristol and a section of Kingsport	X	X		
That portion of Washington County within downtown Johnson City			X	
Rest of State				X

Tennessee—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
That portion of Polk County surrounding the Cities Service plant at Copperhill		X		
That portion of Maury County surrounding the Stauffer Organic Chemical plant at Mt. Pleasant			X	
That portion of Benton and Humphreys Counties surrounding TVA's Johnsonville plant		X		
That portion of Roane County within a downtown section of Rockwood			X	
Rest of State				X

Tennessee—O_3

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Nashville Area—Davidson, Sumner, Rutherford, Wilson and Williamson Counties	[1]X	
Shelby County	[1]X	
Maury County	[1]X	
Hamilton County	[1]X	
Knox County	[1]X	
Sullivan County	[1]X	
Bradley County	[1]X	
Roane County	[1]X	
Rest of State	X	

[1]EPA designation replaces State designation.

Tennessee—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
That portion of Davidson County located in downtown Nashville	X	
That portion of Knox County located in metropolitan Knoxville	X	
That portion of Shelby County located in metropolitan Memphis	X	
Rest of State		X

BEST DOCUMENT AVAILABLE

Tennessee—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Statewide	X	

(Secs. 107, 171, and 301 of the Clean Air Act (42 U.S.C. 7407, 7501, and 7601))

[43 FR 8964, Mar. 3, 1978, as amended at 43 FR 40432, Sept. 11, 1978; 44 FR 63105, Nov. 2, 1979, 45 FR 28337, Apr. 29, 1980; 47 FR 27273, June 24, 1982]

EFFECTIVE DATE NOTE: At 47 FR 27273, June 24, 1982, the table "Tennessee—TSP" was revised, effective Aug. 23, 1982. For the convenience of the user the superseded text appears below.

§ 81.343 Tennessee.

Tennessee—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Those portions of Anderson and Knox Counties surrounding TVA's Bull Run plant		X		
Those portions of Campbell County within downtown Lafollette and the area surrounding the Carborundum Company's plant at Jacksboro	X	X		
That portion of Coffee County within a section of Tullahoma			X	
That portion of Davidson County within the 1964 Urban Services Area of Nashville	X	X		
That portion of Hamilton County within, approximately, the city limits of Chattanooga	X	X		
That portion of Maury County within the northern section of downtown Columbia	X	X		
That portion of Maury County within the remainder of the northern section of Columbia			X	
That portion of Obion County within the downtown section of Union City			X	
That portion of Roane County within a downtown section of Rockwood			X	
Those portions of Shelby County within two sections of downtown Memphis	X	X		
Those portions of Sullivan County within a section of Bristol and a section of Kingsport	X	X		
That portion of Sumner County surrounding TVA's Gallatin plant		X		
That portion of Washington County within downtown Johnson City			[1]X	
Rest of State				X

[1]EPA designation replaces State designation.

§ 81.344 Texas.

Texas—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
AQCR 022				X
AQCR 106				X
AQCR 153:				
3 limited areas in El Paso County	X			
1 limited area in El Paso County (El Paso 3)			X	

BEST DOCUMENT AVAILABLE

Texas—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
1 limited area in El Paso County (El Paso 5)				X
Remainder of AQCR				X
AQCR 210				X
AQCR 211				X
AQCR 212				X
AQCR 213: 2 limited areas in Cameron County	X			
Remainder of AQCR				X
AQCR 214: 2 limited areas in Nueces County	X			
Remainder of AQCR				X
AQCR 215:				
3 limited areas in Dallas County (Dallas 1, 2, and 3)				X
1 limited area in Tarrant County (Tarrant 1)				X
3 limited areas in Tarrant County (Tarrant 2, 3, and 4)			X	
Remainder of AQCR				X
AQCR 216:				
1 limited area in Harris Co. (Houston 1)	X			
1 limited area in Harris Co. (Houston 2)			X	
1 limited area in Harris Co. (Adline)		X		
1 limited area in Harris Co			X	
1 limited area in Galveston Co			X	
Remainder of AQCR				X
AQCR 217: 1 limited area in Bexar County			X	
Remainder of AQCR				X
AQCR 218				X

Texas—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
AQCR 022				X
AQCR 106				X
AQCR 153				
El Paso County			[1]X	
Remainder of AQCR				X
AQCR 210				X
AQCR 211				X
AQCR 212				X
AQCR 213				X
AQCR 214				X
AQCR 215				X
AQCR 216				X
AQCR 217				X
AQCR 218				X

[1]EPA designation replaces State designation.

Texas—O_3

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 022		
Gregg County	[1]X	
Remainder of AQCR		X
AQCR 106		
Jefferson County	X	
Orange County	X	
Remainder of AQCR		X

BEST DOCUMENT AVAILABLE

Texas—O_3

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 153:		
El Paso County	[1]X	
Remainder of AQCR		X
AQCR 210		X
AQCR 211		X
AQCR 212		X
AQCR 213		X
AQCR 214:		
Nueces County	[1]X	
Victoria County	[1]X	
Remainder of AQCR		X
AQCR 215:		
Dallas County	X	
Tarrant County	X	
Remainder of AQCR		X
AQCR 216:		
Brazoria County	X	
Galveston County	X	
Harris County	X	
Remainder of AQCR		X
AQCR 217:		
Bexar County		X
Remainder of AQCR		X

[1]EPA designation replaces State designation.

EDITORIAL NOTE: For a document reaffirming the attainment status designation for ozone for McLennan County, Tex., which was promulgated Apr. 8, 1980 and published at 45 FR 25063, Apr. 14, 1980 see 46 FR 46573, Sept. 21, 1981.

Texas—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 022		X
AQCR 106		X
AQCR 153:		
Portion of the City Kimito of El Paso	X	
Remainder of AQCR		X
AQCR 210		X
AQCR 211		X
AQCR 212		X
AQCR 213		X
AQCR 214		X
AQCR 215		X
AQCR 216		X
AQCR 217		X
AQCR 218		X

Texas—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 022		X
AQCR 106		X

BEST DOCUMENT AVAILABLE

Texas—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 153		X
AQCR 210		X
AQCR 211		X
AQCR 212		X
AQCR 213		X
AQCR 214		X
AQCR 215		X
AQCR 216		X
AQCR 217		X
AQCR 218		X

(Secs. 107(d), 171(2) and 301(a) of the Clean Air Act as amended (42 U.S.C. 7407(d), 7501(2) and 7601(a)))

[43 FR 8964, Mar. 3, 1978, as amended at 43 FR 40434, Sept. 11, 1978; 45 FR 25063, Apr. 14, 1980; 45 FR 48133, July 18, 1980; 45 FR 78123, Nov. 25, 1980; 46 FR 33269, June 29, 1981; 46 FR 56200, Nov. 16, 1981; 47 FR 2115, Jan. 14, 1982; 47 FR 4067, Jan. 28, 1982; 47 FR 17286, Apr. 22, 1982]

§ 81.345 Utah.

Utah—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Portions of Davis County		X		
Portions of Salt Lake County	X			
Portions of Utah County	X			
Portions of Weber County	X			
Rest of State				X

Utah—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Salt Lake County	[1]X	[1]X		
Portions of Tooele County	[1]X	[1]X		
Cedar City	X	X		
Rest of State				X

[1]EPA designation replaces State designation.

Utah—O_3

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Salt Lake County	X	
Davis County	X	
Rest of State		X

BEST DOCUMENT AVAILABLE

Utah—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Salt Lake City	X	
City of Bountiful	X	
City of Ogden	X	
City of Provo	X	
Rest of State		X

Utah—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Entire State		X

[43 FR 8964, Mar. 3, 1978, as amended at 43 FR 40434, Sept. 11, 1978; 46 FR 16258, Mar. 12, 1981; 46 FR 41785, Aug. 18, 1981]

§ 81.346 Vermont.

Vermont—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Champlain Valley Air Management consisting of townships and cities listed below: Essex Town (includes Essex Junction); Burlington City; South Burlington City; Winooski City		X		
Central Vermont Air Management Area consisting of the city listed below: Barre City		X		
Remainder of the State			X	

Vermont—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
AQCR 159 (Vermont portion)				X
AQCR 221 (Vermont portion)				X

Vermont—O_3

Designated areas	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 159 (Vermont portion):		
Addison County		X
Chittenden County		X
Rest of AQCR		X

BEST DOCUMENT AVAILABLE

Vermont—O_3

Designated areas	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 221 (Vermont portion):		
Windsor County		X
Rest of AQCR		X

Vermont—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Champlain Valley Air Management Area: Consisting of the townships and cities listed below: Colchester Town, Winooski City, Essex Town, Burlington City, S. Burlington City, Williston Town, Shelburne Town, St. George Town	X	
Remainder of the State		X

Vermont—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 159 (Vermont portion)		X
AQCR 211 (Vermont portion)		X

(Secs. 110(a) and 301(a) of the Clean Air Act, as amended (42 U.S.C. 7410(a) and 7601(a))
[43 FR 8964, Mar. 3, 1978, as amended at 45 FR 10782, Feb. 19, 1980; 46 FR 41784, Aug. 18, 1981]

§ 81.347 Virginia.

Virginia—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Eastern Tennessee, Southwest Virginia, Interstate AQCR (Virginia Portion):				
Bland County				X
Buchanan County			X	
Carroll County				X
Dickenson County				X
Grayson County				X
Lee County				X
Russell County				X
Scott County				X
Smyth County				X
Tazewell County			X	
Washington County			X	
Wise County				X
Wythe County				X
City of Bristol				X
City of Galax			X	
City of Norton			X	

BEST DOCUMENT AVAILABLE

Virginia—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Valley of Virginia Intrastate AQCR:				
Alleghany County				X
Augusta County				X
Bath County				X
Botetourt County				X
Clarke County				X
Craig County				X
Floyd County				X
Frederick County			X	
Giles County				X
Highland County				X
Montgomery County				X
Page County				X
Pulaski County			X	
Roanoke County			X	
Rockbridge County				X
Rockingham County				X
Shenandoah County				X
Warren County			X	
City of Buena Vista				X
City of Clifton Forge				X
City of Covington				X
City of Harrisonburg				X
City of Lexington				X
City of Radford				X
City of Roanoke				X
City of Salem				X
City of Staunton				X
City of Waynesboro			X	
City of Winchester				X
Central Virginia Intrastate AQCR:				
Amelia County				X
Amherst County				X
Appomattox County				X
Bedford County				X
Brunswick County				X
Buckingham County				X
Campbell County				X
Charlotte County				X
Cumberland County				X
Franklin County				X
Halifax County				X
Henry County			X	
Lunenburg County				X
Mecklenburg County				X
Nottoway County				X
Patrick County				X
Pittsylvania County			X	
Prince Edward County			X	
City of Bedford			X	
City of Danville				X
City of Lynchburg			X	
City of Martinsville				X
City of South Boston				X
Northeastern Virginia Intrastate AQCR:				
Accomack County				X
Albemarle County				X
Caroline County				X
Culpeper County				X
Essex County				X
Fauquier County				X
Fluvanna County				X
Gloucester County				X
Greene County				X
King and Queen County				X
King George County				X
King William County				X

BEST DOCUMENT AVAILABLE

Virginia—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Lancaster County				X
Louisa County				X
Madison County				X
Mathews County				X
Middlesex County				X
Nelson County				X
Northampton County				X
Northumberland County				X
Orange County				X
Rappahannock County				X
Richmond County				X
Spotsylvania County				X
Stafford County				X
Westmoreland County				X
City of Charlottesville				X
City of Fredericksburg				
State Capital Intrastate AQCR:				
Charles City County				X
Chesterfield County				X
Dinwiddie County				X
Goochland County				X
Greensville County				X
Hanover County				X
Henrico County				X
New Kent County				X
Powhatan County				X
Prince George County				X
Surrey County				X
Sussex County			X	
City of Colonial Heights				X
City of Emporia				X
City of Hopewell			X	
City of Petersburg				X
City of Richmond			X	
Hampton Roads Intrastate AQCR:				
Isle of Wight County				X
James City County				X
Southampton County				X
York County				X
City of Chesapeake			X	
City of Franklin				X
City of Hampton				X
City of Newport News				X
City of Norfolk				X
City of Poquoson				X
City of Portsmouth				X
City of Suffolk				X
City of Virginia Beach				X
City of Williamsburg				X
National Capital Interstate AQCR (Viriginia Portion):				
Arlington County			X	
Fairfax County			X	
Loudoun County				X
Prince William County			X	
City of Alexandria			X	
City of Fairfax			X	
City of Falls Church				X
City of Manassas				X
City of Manassas Park				X

BEST DOCUMENT AVAILABLE

Virginia—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Eastern Tennessee Southwest Virginia Interstate AQCR (Virginia Portion):				
Bland County				X
Buchanan County				X
Carroll County				X
Dickenson County				X
Grayson County				X
Lee County				X
Russell County				X
Scott County				X
Smyth County				X
Tazewell County				X
Washington County				X
Wise County				X
Wythe County				X
City of Bristol				X
City of Galax				X
City of Norton				X
Valley of Virginia Intrastate AQCR:				
Alleghany County				X
Augusta County				X
Bath County				X
Botetourt County				X
Clarke County				X
Craig County				X
Floyd County				X
Frederick County				X
Giles County				X
Highland County				X
Montgomery County				X
Page County				X
Pulaski County				X
Roanoke County				X
Rockbridge County				X
Rockingham County				X
Shenandoah County				X
Warren County				X
City of Buena Vista				X
City of Clifton Forge				X
City of Covington				X
City of Harrisonburg				X
City of Lexington				X
City of Radford				X
City of Roanoke				X
City of Salem				X
City of Staunton				X
City of Waynesboro				X
City of Winchester				X
Central Virginia Intrastate AQCR:				
Amelia County				X
Amherst County				X
Appomattox County				X
Bedford County				X
Brunswick County				X
Buckingham County				X
Campbell County				X
Charlotte County				X
Cumberland County				X
Franklin County				X
Halifax County				X
Henry County				X
Lunenburg County				X
Mecklenburg County				X
Nottoway County				X
Patrick County				X
Pittsylvania County				X
Prince Edward County				X

BEST DOCUMENT AVAILABLE

Virginia—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
City of Bedford				X
City of Danville				X
City of Lynchburg				X
City of Martinsville				X
City of South Boston				X
Northeastern Virginia Intrastate AQCR:				
Accomack County				X
Albemarle County				X
Caroline County				X
Culpeper County				X
Essex County				X
Fauquier County				X
Fluvanna County				X
Gloucester County				X
Greene County				X
King and Queen County				X
King George County				X
King William County				X
Lancaster County				X
Louisa County				X
Madison County				X
Mathews County				X
Middlesex County				X
Nelson County				X
Northampton County				X
Northumberland County				X
Orange County				X
Rappahannock County				X
Richmond County				X
Spotsylvania County				X
Stafford County				X
Westmoreland County				X
City of Charlottesville				X
City of Fredericksburg				X
State Capital Intrastate AQCR:				
Charles City County				X
Chesterfield County				X
Dinwiddie County				X
Goochland County				X
Greensville County				X
Hanover County				X
Henrico County				X
New Kent County				X
Powhatan County				X
Prince George County				X
Surry County				X
Sussex County				X
City of Colonial Heights				X
City of Emporia				X
City of Hopewell				X
City of Petersburg				X
City of Richmond				X
Hampton Roads Intrastate AQCR				X
Isle of Wight County				X
James City County				X
Southampton County				X
York County				X
City of Chesapeake				X
City of Franklin				X
City of Hampton				X
City of Newport News				X
City of Norfolk				X
City of Poquoson				X
City of Portsmouth				X
City of Suffolk				X
City of Virginia Beach				X
City of Williamsburg				X

BEST DOCUMENT AVAILABLE

Virginia—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
National Capital Interstate AQCR (Virginia Portion):				
Arlington County				X
Fairfax County				X
Loudoun County				X
Prince William County				X
City of Alexandria				X
City of Fairfax				X
City of Falls Church				X
City of Manassas				X
City of Manassas Park				X

Virginia—O_3

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
I. Southwest Virginia-Tennessee Interstate AQCR		X
II. Valley of Virginia Intrastate AQCR:		
Roanoke County	X	
Roanoke City	X	
Salem City	X	
Remainder of AQCR		X
III. Central Virginia Intrastate AQCR		X
IV. Northeastern Virginia Interstate AQCR:		
Stafford County	X	
Remainder of AQCR		X
V. State Capital Intrastate AQCR:		
Richmond City	X	
Henrico County	X	
Chesterfield County	X	
Remainder of AQCR		X
VI. Hampton Roads Intrastate AQCR:		
Chesapeake City	X	
Norfolk City	X	
Portsmouth City	X	
Suffolk City	X	
Virginia Beach City	X	
Newport News City	X	
Hampton City	X	
Remainder of AQCR		X
VII. National Capital Interstate AQCR	X	

Virginia—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Virginia portion of Southwest Virginia—Eastern Tennessee Interstate AQCR		X
Valley of Virginia AQCR		X
Central Virginia AQCR		X
Northeastern Virginia AQCR		X
City of Richmond		X
Remainder of State Capital AQCR		X
Norfolk		X
Hampton		X
Remainder of Hampton Roads AQCR		X
Alexandria	X	

BEST DOCUMENT AVAILABLE

Virginia—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Arlington County	X	
Fairfax County—Areas of high traffic density	X	
Remainder of the Virginia portion of National Capital Interstate AQCR		X

Virginia—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Virginia portion of Southwest Virginia—Eastern Tennessee Interstate AQCR		X
Valley of Virginia AQCR		X
Central Virginia AQCR		X
Northeastern Virginia AQCR		X
State Capital AQCR		X
Hampton Roads AQCR		X
Virginia portion of National Capital Interstate AQCR		X

(Secs. 107(d), 171(2), 301(a), of the Clean Air Act, as amended (42 U.S.C. 7407(d), 7501(2), 7601(a))

[43 FR 40518, Sept. 12, 1978, as amended at 45 FR 43413, June 27, 1980; 46 FR 55258, Nov. 9, 1981]

§ 81.348 Washington.

Washington—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Seattle—that area including the north portion of the Duwamish industrial area, and extending to the southern boundary of the CED	X			
Seattle—an area of the Duwamish Valley extending approximately 2½ miles further south than the above area		X		
Renton		X		
Kent		X		
Tacoma—that area including the Tide Flats industrial area, east end of the CED, and the north end of South Tacoma Way corridor	X			
Port Angeles—small area of the CED		X		
Longview—industrial area		X		
Vancouver—small portions of the industrial port area	X			
Spokane	X			
Clarkston	[1]X			
Remainder of State				

[1]EPA designation replaces State designation.

BEST DOCUMENT AVAILABLE

Washington—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Tacoma—a parabolic shaped area extending approximately 3½ miles SSW from the ASARCO copper smelter			X	
Remainder of State				X

Washington—O_3

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Greater Seattle-Tacoma Area—in general, from Puget Sound at the west to North Bend at the east, from Puyallup at the south to Edmonds at the north	X	
Portland-Vancouver AQMA (Washington portion)	[1]X	
Spokane		[1]X
Remainder of State		X

[1]EPA designation replaces State designation.

Washington—CO

Designated area	Does not meet primary standard	Cannot be classified	Better than national standards
Puget Sound Intrastate AQCR			
Seattle-Central Business District (CBD)	X		
Seattle-Dearborn Street & Rainier Ave. Corridor	X		
Seattle-University District	X		
Bellevue-CBD	X		
Tacoma-CBD	X		
Everett		X	
Seattle		X	
Bellevue		X	
Tacoma		X	
Puyallup		X	
Auburn		X	
Remainder of Puget Sound Intrastate AQCR			X

Washington—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Entire State		X

(Secs. 107(d), 171(2), 301(a) If the Clean Air Act, as amended (42 U.S.C. 7407(d) and 7501(2), 7601(a)))

[43 FR 8964, Mar. 3, 1978, as amended at 43 FR 40435, Sept. 11, 1978; 44 FR 68834, Nov. 30, 1979; 46 FR 61657, Dec. 18, 1981]

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BEST DOCUMENT AVAILABLE

§ 81.349 West Virginia.

West Virginia—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Steubenville-Weirton-Wheeling interstate AQCR	X			
Parkersburg-Tygart magisterial district in Wood County		X		
Kanawha County and Valley magisterial district in Fayette County		X		
In Marion County, all portions of Union and Winfield magisterial districts west of interstate Highway I-79	X			
Arden magisterial district in Berkeley County			X	
Remainder of State				X

West Virginia—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
New Manchester-Grant magisterial district in Hancock County	X			
Piedmont magisterial district in Mineral County			X	
Remainder of State				X

West Virginia—O_3

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
State of West Virginia		X

West Virginia—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
State of West Virginia		X

West Virginia—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
State of West Virginia		X

(Sec. 107(d), 171(2), 301(a) of the Clean Air Act, as amended (42 U.S.C. 7407(d), 7501(2), 7601(a)))

[43 FR 40521, Sept. 12, 1978, as amended at 45 FR 54053, Aug. 14, 1980; 46 FR 55262, Nov. 9, 1981]

BEST DOCUMENT AVAILABLE

§ 81.350 Wisconsin.

Wisconsin—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
AQCR 68				
Grant County				X
AQCR 73				
Rock County				
Beloit Sub-city defined as follows	X			
North: Woodward Ave. from 3rd St. and Portland east to Park Avenue				
West: Corner of 3rd St., Portland and Woodward South on 3rd St. to Second St. Southwest on Second St. to Grand Avenue. Then southeast on Grand to State St. and South on State to the Illinois-Wisconsin Border				
South: Illinois-Wisconsin Border				
East: Park Avenue from Illinois-Wisconsin Border				
Sub-city area defined as follows		X		
North: From Washburn and Wisconsin Ave. west to the intersection of Chicago Northwestern Railroad tracks and Lennigan Creek				
West: From Chicago Northwestern intersection RR tracks and Lennigan Creek. South on RR tracks to the Illinois-Wisconsin Border				
South: Illinois-Wisconsin Border				
East: Dearborn Ave. from the Ill-WI border north to Grand Ave. continuing northwest on Grand Ave. to Wisconsin Ave. and north on Wisconsin to Washburn Street				
Remainder of Rock County				X
AQCR 128				
Barron County				X
Buffalo County				X
Chippewa County				X
Clark County				X
Crawford County				X
Dunn County				X
Eau Claire County				X
Jackson County				X
La Crosse County				X
Monroe County				X
Pepin County				X
Pierce County				X
Polk County				X
St. Croix County				X
Trempealeau County				X
Vernon County				X
AQCR 129				
Ashland County				X
Bayfield County				X
Burnett County				X
Douglas County				X
Superior Sub-city areas defined as follows		X		
AREA 1: *West*: Superior Bay and St. Louis Bay shoreline from intersection with Belknap St. to intersection with E St. East				
South: East from intersection of Belknap St. and Minnesota-Wisconsin border to Oaks Ave. south on Oaks Ave. from Belknap Street and 19th Street east on 19th Street from Oaks Ave. to Hill Ave. North on Hill Ave. to E St. East. Northeast on E St. East to MN-WI border in Superior Bay				
AREA 2: *North*: Corner East Eighth St. and 37th St., North along 37th St. to Superior Bay				
West: Corner east Eighth Street and 37th St., east along East Eighth St. to intersection with last set of railroad tracks				
South: Intersection of last set of railroad tracks, north to Allouez Bay				
East: Allouez Bay and Superior Bay North from point where South boundary intersects to Intersection of 37th Ave. and shoreline				
Remainder of Douglas County				X

BEST DOCUMENT AVAILABLE

Wisconsin—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Iron County				X
Price County				X
Rusk County				X
Sawyer County				X
Taylor County				X
Washburn County				X
AQCR 237				
Brown County, Green Bay		X		
Sub-city area defined as follows				
North: Green Bay				
West: Corner west Mason St. and Ashland Ave. north to Mather St., west to Crocker Street, north on Crocker St. to Bvlsby St., then to Green Bay				
South: Corner west Mason St. and Ashland Ave., east along west Mason St. to Irvin Ave.				
East: Corner west Mason St. and Irvin Ave. north along Irvin Ave. to Green Bay				X
Remainder of Brown County				X
Calumet County				X
Door County				X
Fond du Lac County				X
Green Lake County				X
Kewaunee County				X
Manitowoc		X		
Manitowoc—Sub-city area defined as follows				
North: East from Manitowoc River to York St. to Lake Michigan				
West: 14 St. south from Wollmer St. to Hamilton St				
South: Hamilton St. east from 14th St. to Lake Michigan				
East: Lake Michigan				X
Remainder of Manitowoc Co.				
Marinette County			X	
Marinette—corporate limits of Marinette				X
Remainder of Marinette Co.				X
Marquette County				X
Menominee				X
Oconto				X
Outagamie				X
Shawano				X
Sheboygan				X
Waupaca				X
Waushara				X
Winnebago				
Neenah		X		
Sub-city area defined as follows				
North: Corner Caroline St. and Harrison St. east to Franklin St. continue southeast on Franklin St. to Oak St.				
West: Corner Dixie and Cecil Streets north to Harrison St., continue north on Harrison Street to Caroline Street				
South: Corner Dixie Street and Cecil Street. East on Cecil St. to Higgins Ave.				
East: Corner Franklin St. and Oak St. south on Oak St. to Laudan Boulevard, west on Lauden Blvd. to Higgins Ave., south on Higgins Ave. to Cecil St.				
Oshkosh Sub-city area defined as follows		X		
North: Corner Irving Ave. and Wisconsin Ave. east to Bowen Street				
West: Corner Ohio St. and west 11th Ave. north to Route 26/44, continue northeast along Route 26/44 to intersection with Irving Avenue				
South: Corner Ohio St. and west 11th Ave., east along west 11th Ave. to Lake Winnebago				
East: Corner Irving Ave. and Bowen St., South along Bowen to Lake Winnebago				X
Remainder of Winnebago Co.				X
AQCR 238				X
Adams County				X
Florence County				

BEST DOCUMENT AVAILABLE

Wisconsin—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Forest County				X
Juneau County				X
Langlade County				X
Lincoln County				X
Marathon County				
Brokaw—corporate limits of Brokaw		X		
Remainder of Marathon Co				X
Oneida County				X
Portage County				X
Vilas County				X
Wood County				
Marshfield Sub-city area defined as follows		X		
North: Chicago and Northwestern railroad track				
West: Western border of section 18 north to Chicago and Northwestern railroad tracks				
South: Southern border of section 17 and 18				
East: Eastern border of section 17 north to Chicago and Northwestern railroad tracks				
Remainder of Wood County				X
AQCR 239				
Kenosha County				
Kenosha Sub-city area defined as follows		X		
North: 52nd Street east from 39th Avenue to Lake Michigan				
West: 39th Avenue south from 52nd Street to 67th Street				
South: 67th from 39th Avenue to Lake Michigan				
East: Lake Michigan				
Remainder of Kenosha Co				X
Milwaukee County				
Milwaukee Sub-city area defined as follows	X			
North: St. Paul Avenue from corner 16th Street to Lake Michigan				
West: 16th Street south from St. Paul Avenue to Pierce Street, east on Pierce Street to 6th St., south on 6th Street to Becher Street				
South: Becher Street east from 6th to Lake Michigan				
East: Lake Michigan				
Sub-city areas defined as follows		X		
Area 1 North: Center Street east from 55th Street to Lake Michigan				
West: 55th Street south from North Avenue extended to 56th Street				
South: Oklahoma Avenue east from 56th St. to 6th St., south on 6th St. to Morgan Ave., east on Morgan Ave. to Lake Michigan				
East: Lake Michigan				
Area 2 North: From Pennsylvania Ave. to 13th St. on Howard Ave				
West: From Howard to College Ave. on 13th St				
South: From 13th St. to Pennsylvania Ave. on College Ave				
East: From College Ave. to Howard Ave. on Pennsylvania Ave				
Remainder of Milwaukee Co				X
Ozaukee County				X
Racine County				
Racine Sub-city area defined as follows		X		
North: Douglas Avenue north from Marquette St. To Rapids Drive, northwest on Rapids Drive to intersection with Forest St. west to intersection with west boundary				
West: North from corner of Grange Avenue and Washington Avenue north to Freres Avenue north to intersection with north boundary				
South: Washington Avenue west from Grange Avenue to Marquette Street				
East: Marquette Street north from Washington Avenue to Douglas Ave				
Remainder of Racine County				X
Walworth County				
Lake Geneva			X	

BEST DOCUMENT AVAILABLE

Wisconsin—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Remainder of Walworth Co				X
Washington County				X
Waukesha County:				
Waukesha Sub-city area defined as follows	X			
North: East on Eales Ave. from Whiterock Ave. to Niagara St				
West: Whiterock Avenue north from Main Street to Eales Avenue				
South: Southwest along Main Street from intersection of railroad track and Main Street to Whiterock Avenue				
East: Southeast from the intersection of Eales Ave. to the intersection of the railroad tracks and Main Street				
Sub-city area defined as follows		X		
North: West along Margaret St. from corner of Margaret St. and Highland Ave. to North St.				
West: North St. north from Union St. to intersection with north boundary				
South: West on Arcadian Avenue from intersection of railroad track and Arcadian Ave. to East Ave. north on East Ave. to Buckley St., across Fox River to Union St. then to North St.				
East: South on Highland Avenue to Moreland Blvd. west on Moreland Blvd. to Waukesha Ave., south on Waukesha Ave. to intersection of railroad tracks and Main St., south along railroad tracks to Arcadian Avenue				
Remainder of Waukesha Co				X
AQCR 240:				
Columbia County:				
Pacific Township Sub-township area defined a follows	X			
Pacific Township (from Township Map T.12 N.-R.9E				
North: Northern border of section 22 from USH 16 east to section 23				
West: C.M. St. P&P Railroad south from northern border of section 22 to southern border of section 22				
South: Southern border of section 22 east from C.M. St. P&P Railroad to section 23				
East: Eastern border of section 22				
Sub-township area defined as follows: Sections 22, 23, 26 and 27 of T.12 N.-R.9 E		X		
Remainder of Columbia Co				X
Dane County:				
Madison Sub-city area defined as follows		X		
North: Corner of Schlimgan Ave. and Padkers Ave. west to Lakewook Blvd				
Northwest: Corner of Lakewood Blvd. and Del Mar Drive south to Lake Mendota, continue along eastern shoreline of Lake Mendota to Charter Street				
West: Charter St. north from Vilas St. to Lake Mendota				
South Southeast: Vilas St. east from Charter St. to west Washington Ave., continue southeast to Lake Monona, continue along west shoreline of Lake Monona northeast to Starkweather Creek				
North Northeast: Western branch of Starkweather Creek northeast to Fair Oaks Ave., then north along Bryan St. to Milwaukee St. continue west to Oak St. then north to Aberg Ave., continue northwest to Packers Ave., then north to Schlingen Ave				
Remainder of Dane County				X
Dodge County				X
Green County				X
Iowa County				X
Jefferson County				X
Lafayette County				X
Richland County				X
Sauk County				X

BEST DOCUMENT AVAILABLE

Wisconsin—SO_x

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
AQCR 68:				
Grant County				X
AQCR 73:				
Rock County				X
AQCR 123:				
Barron County				X
Buffalo County				X
Chippewa County				X
Clark County				X
Crawford County				X
Dunn County				X
Eau Claire County				X
Jackson County				X
LaCrosse County				X
Monroe County				X
Pepin County				X
Pierce County				X
Polk County				X
St. Croix County				X
Trempealeau County				X
Vernon County				X
AQCR 129:				
Ashland County				X
Bayfield County				X
Burnett County				X
Douglas County				X
Iron County				X
Price County				X
Rusk County				X
Sawyer County				X
Taylor County				X
Washburn County				X
AQCR 237:				
Brown County (city of Green Bay): Subcity area defined as follows	X			
North: Green Bay				
West: W. Mason St. and Ashland Ave., along Ashland north to Matter St., west to Crocker St., north on Crocker St. to Bylsby St., then to Green Bay				
South: W. Mason St. and Ashland Ave., east along Mason to Irwin Ave				
East: W. Mason St., and Irwin Ave., along Irwin Ave. north to Green Bay				
Remainder of Corporate Limits of Green Bay			X	
Remainder of Brown County				X
Calumet County				X
Door County				X
Fond du Lac County				X
Green Lake County				X
Kewaunee County				X
Manitowoc County				X
Marinette County				X
Marquette County				X
Menomonee County				X
Oconto County				X
Outagamie County				X
Shawano County				X
Sheboygan County				X
Waupaca County				X
Waushara County				X
Winnebago County				X
AQCR 238:				
Adams County				X
Florence County				X
Forest County				X
Juneau County				X
Langlade County				X

BEST DOCUMENT AVAILABLE

Wisconsin—SO_x

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Lincoln County				X
Marathon County:				
Brokaw—corporate limits of Brokaw	X	X		
Remainder of Marathon County				X
Oneida County				X
Portage County				X
Vilas County				X
Wood County				X
AQCR 239:				
Kenosha County				X
Milwaukee County (city of Milwaukee):				
Subcity area defined as follows	X			
North: Milwaukee River and Capitol Drive up to Lake Michigan				
West: South along Milwaukee River to St. Paul, west along St. Paul to 16th St., south on 16th St., to Pierce, then east along Pierce to 6th St., again south on 6th St. to Becher St				
South: 6th and Becher to the Lake				
East: Lake Michigan				
Remainder of Milwaukee County				X
Ozaukee County				X
Racine County				X
Walworth County				X
Washington County				X
Waukesha County				X
AQCR 240:				
Columbia County				X
Dane County:				
Madison—sub-city area defined as follows	[1]X			
North: Corner Sherman Ave. and Vahlen St. east along Vahlen St. to Packers Avenue				
West: Sherman Avenue north from Yahara River to Vahlen St				
Southwest: Yahara River north from east Washington Ave. to Sherman Ave				
South: East Washington Ave. from Yahara River to Aberg Avenue				
East: Intersection Aberg and Washington Ave. northwest to intersection with Packers Ave., then Packers Ave. north to corner Vahlen St				
Remainder of Dane County				X
Dodge County				X
Green County				X
Iowa County				X
Jefferson County				X
Lafayette County				X
Richland County				X
Sauk County				X

[1]EPA designation replaces State designation.

Wisconsin—O_x

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 68:		
Grant County		X
AQCR 73:		
Rock County		X
AQCR 128:		
Barron County		X

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Wisconsin—O_x

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Buffalo County		X
Chippewa County		X
Clark County		X
Crawford County		X
Dunn County		X
Eau Claire County		X
Jackson County		X
LaCrosse County		X
Monroe County		X
Pepin County		X
Pierce County		X
Polk County		X
St. Croix County		X
Trempealeau County		X
Vernon County		X
AQCR 129		X
Ashland County		
Bayfield County		X
Burnett County		X
Douglas County		X
Iron County		X
Price County		X
Rusk County		X
Sawyer County		X
Taylor County		X
Washburn County		X
AQCR 237		X
Brown County		
Calumet County	X	
Door County		X
Fond du Lac County		X
Green Lake County		X
Kewaunee County		X
Manitowoc County		X
Marinette County		X
Marquette County		X
Menomonee County		X
Oconto County		X
Outagamie County		X
Shawano County		X
Sheboygan County		X
Waupeca County	X	
Waushara County		X
Winnebago County		X
AQCR 238		X
Adams County		
Florence County		X
Forest County		X
Juneau County		X
Langlade County		X
Lincoln County		X
Marathon County		X
Oneida County		X
Portage County		X
Vilas County		X
Wood County	X	
AQCR 239		X
Kenosha County		
Milwaukee County	X	
Ozaukee County	X	
Racine County	X	
Walworth County	X	
Washington County		X
Waukesha County		X
AQCR 240	X	
Columbia County		
Dane County	X	
	X	

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Wisconsin—O_x

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Dodge County		X
Green County		X
Iowa County		X
Jefferson County		X
Lafayette County		X
Richland County		X
Sauk County		X

Wisconsin—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
AQCR 68:		
Grant County		X
AQCR 73:		
Rock County		X
AQCR 128:		
Barron County		X
Buffalo County		X
Chippewa County		X
Clark County		X
Crawford County		X
Dunn County		X
Eau Claire County		X
Jackson County		X
LaCrosse County		X
Monroe County		X
Pepin County		X
Pierce County		X
Polk County		X
St. Croix County		X
Trempealeau County		X
Vernon County		X
AQCR 129:		
Ashland County		X
Bayfield County		X
Burnett County		X
Douglas County		X
Iron County		X
Price County		X
Rusk County		X
Sawyer County		X
Taylor County		X
Washburn County		X
AQCR 237:		
Brown County		X
Calumet County		X
Door County		X
Fond du Lac County		X
Green Lake County		X
Kewaunee County		X
Manitowoc County		X
Marinette County		X
Marquette County		X
Menomonee County		X
Oconto County		X
Outagamie County		X
Shawano County		X
Sheboygan County		X
Waupaca County		X

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Wisconsin—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Waushara County		X
Winnebago County		X
AQCR 238:		
Adams County		X
Florence County		X
Forest County		X
Juneau County		X
Langlade County		X
Lincoln County		X
Marathon County		X
Oneida County		X
Portage County		X
Vilas County		X
Wood County		X
AQCR 239:		
Kenosha County		X
Milwaukee:		
North 75th Street and West Beckett Street on the east, West Perkins Avenue on the south, North 77th Street on the west, and West Hope Avenue and Marion Street on the north	X	
The north boundary is West Wisconsin Avenue from 16th Street to 6th Street, the east boundary is 6th Street from Wisconsin Avenue to the Menomonee River, the south boundary is the Menomonee River, and the west boundary is 16th Street from the Menomonee River to West Wisconsin Avenue		X
The remainder of Milwaukee County		X
Ozaukee County		X
Racine County		X
Walworth County		X
Washington County		X
Waukesha County		X
AQCR 240:		
Columbia County		X
Dane County		X
Dodge County		X
Green County		X
Iowa County		X
Jefferson County		X
Lafayette County		X
Richland County		X
Sauk County		X

Wisconsin—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
State of Wisconsin		X

(Sec. 107(d), 171(2), and 301(a) of the Clean Air Act, as amended (42 U.S.C. 7407(d), 7502, 7601(a)))

[43 FR 8964, Mar. 3, 1978, as amended at 43 FR 46016, Oct. 5, 1978; 45 FR 67349, Oct. 8, 1980; 46 FR 25301, May 6, 1981; 46 FR 41057, Aug. 14, 1981; 47 FR 16334, Apr. 16, 1982; 46 FR 61127, Dec. 15, 1981]

EDITORIAL NOTE: At 46 FR 61127, Dec. 15, 1981, the entry for "Milwaukee County" in the table "Wisconsin—CO" was incorrectly published as an amendment to § 81.351. A correction document will be published by the EPA at a later date.

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§ 81.351 Wyoming.

Wyoming—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Trona Industrial Area (Sweetwater County)	X			
Rest of State				X

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Wyoming—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Entire State				X

Wyoming—O_x

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Entire State		X

Wyoming—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Entire State		X

Wyoming—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Entire State		X

§ 81.352 American Samoa.

American Samoa—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Whole State				[1]X

[1]EPA designation only.

American Samoa—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Whole State				[1]X

[1]EPA designation only.

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American Samoa—O_x

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Whole State		[1]X

[1]EPA designation only.

American Samoa—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Whole State		[1]X

[1]EPA designation only.

American Samoa—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Whole State		[1]X

[1]EPA designation only.

§ 81.353 Guam.

Guam—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Whole State			[1]X	

[1]EPA designation replaces State designation.

Guam—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
That portion of Guam within a 3½ km radius of the Piti Power Plant	X			
That portion of Guam within a 3½ km radius of the Tanguisson Power Plant	[1]X			
Remainder of State (Guam)				X

[1]EPA designation replaces State designation.

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Guam—O_x

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Whole State		X

Guam—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Whole State		X

Guam—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Whole State		X

[43 FR 8964, Mar. 3, 1978, as amended at 44 FR 16393, Mar. 19, 1979; 47 FR 28626, July 1, 1982]

EFFECTIVE DATE NOTE: At 47 FR 28626, July 1, 1982, the table for "Guam—SO_2" was revised, effective Aug. 2, 1982. For the convenience of the user, the superseded text appears below.

Guam—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Whole State		[1]X		

[1]EPA designation replaces State designation.

§ 81.354 Northern Mariana Islands.

Northern Mariana Islands—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Whole State				[1]X

[1]EPA designation only

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Northern Mariana Islands—SO_x

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Whole State				[1]X

[1]EPA designation only.

Northern Mariana Islands—O_x

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Whole State		[1]X

[1]EPA designation only.

Northern Mariana Islands—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Whole State		[1]X

[1]EPA designation only.

Northern Mariana Islands—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Whole State		[1]X

[1]EPA designation only.

§ 81.355 Puerto Rico.

Puerto Rico—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Catano Air Basin [1]	X	X		
Guayanilla Air Basin [1]		X		
Municipality of Dorado			X	
Municipality of Ponce			X	
Remainder of AQCR				X

[1]Geographic boundary is described in the text.

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Puerto Rico—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Catano Air Basin [1]			X	
Remainder of AQCR				X

[1]Geographic boundary is described in the text

Puerto Rico—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Puerto Rico AQCR		X

Puerto Rico—Oxidants

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Puerto Rico AQCR		X

Puerto Rico—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Puerto Rico AQCR		X

[44 FR 5131, Jan. 25, 1979]

§ 81.356 Virgin Islands.

Virgin Islands—TSP

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Virgin Islands AQCR				
St. Croix (an area bounded on the west by 64 48 W longitude; on the east by 64 43 W longitude; on the north by 17 44 N latitude; and on the south by the Krause Lagoon, Limetree Bay, and the Canegarden Bay			X	
Remainder of AQCR				X

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Virgin Islands—SO_2

Designated area	Does not meet primary standards	Does not meet secondary standards	Cannot be classified	Better than national standards
Virgin Islands AQCR				
St. Croix (southern)			[1]X	
Remainder of AQCR				X

[1] EPA designation replaces State designation.

Virgin Islands—CO

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Virgin Islands AQCR		X

Virgin Islands—Oxidants

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Virgin Islands AQCR		X

Virgin Islands—NO_2

Designated area	Does not meet primary standards	Cannot be classified or better than national standards
Virgin Islands AQCR		X

[44 FR 5133, Jan. 25, 1979]

Subpart D—Identification of Mandatory Class I Federal Areas Where Visibility Is an Important Value

AUTHORITY: Secs. 101(b)(1), 110, 169A(a)(2), and 301(a) of the Clean Air Act as amended (42 U.S.C. 7401(b), 7410, 7491(a)(2), 7601(a)).

SOURCE: 44 FR 69124, Nov. 30, 1979, unless otherwise noted.

§ 81.400 Scope.

Subpart D, §§ 81.401 through 81.437 lists those mandatory Federal Class I areas, established under the Clean Air Act Amendments of 1977, where the Administrator, in consultation with the Secretary of the Interior, has determined visibility to be an important value. The following listing of areas where visibility is an important value represents an evaluation of all international parks (IP), national wilderness areas (Wild) exceeding 5,000 acres, national memorial parks (NMP) exceeding 5,000 acres, and national parks (NP) exceeding 6,000 acres, in existence on August 7, 1977. Consultation by EPA with the Federal Land Managers involved: The Department of Interior (USDI), National Park Service (NPS), and Fish and Wildlife Service

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(FWS); and the Department of Agriculture (USDA), Forest Service (FS).

§ 81.401 Alabama.

Area name	Acreage	Public Law establishing	Federal land manager
Sipsey Wild	12,646	93-622	USDA-FS

§ 81.402 Alaska.

Area name	Acreage	Public Law establishing	Federal land manager
Bering Sea Wild	41,113	91-622	USDI-FWS
Mount McKinley NP	1,949,493	64-353	USDI-NPS
Simeonof Wild	25,141	94-557	USDI-FWS
Tuxedni Wild	6,402	91-504	USDI-FWS

§ 81.403 Arizona.

Area name	Acreage	Public Law establishing	Federal land manager
Chiricahua National Monument Wild	9,440	94-567	USDI-NPS
Chiricahua Wild	18,000	88-577	USDA-FS
Galiuro Wild	52,717	88-577	USDA-FS
Grand Canyon NP	1,176,913	65-277	USDI-NPS
Mazatzal Wild	205,137	88-577	USDA-FS
Mount Baldy Wild	6,975	91-504	USDA-FS
Petrified Forest NP	93,493	85-358	USDI-NPS
Pine Mountain Wild	20,061	92-230	USDA-FS
Saguaro Wild	71,400	94-567	USDI-FS
Sierra Ancha Wild	20,850	88-577	USDA-FS
Superstition Wild	124,117	88-577	USDA-FS
Sycamore Canyon Wild	47,757	92-241	USDA-FS

§ 81.404 Arkansas.

Area name	Acreage	Public Law establishing	Federal land manager
Caney Creek Wild	14,344	93-622	USDA-FS
Upper Buffalo Wild	9,912	93-622	USDA-FS

§ 81.405 California.

Area name	Acreage	Public Law establishing	Federal land manager
Agua Tibia Wild	15,934	93-632	USDA-FS
Caribou Wild	19,080	88-577	USDA-FS
Cucamonga Wild	9,022	88-577	USDA-FS
Desolation Wild	63,469	91-[illegible]	USDA-FS
Dome Land Wild	62,206	88-577	USDA-FS
Emigrant Wild	104,311	93-632	USDA-FS
Hoover Wild	47,916	88-577	USDY-FS
John Muir Wild	484,673	8-577	USDA-FS
Joshua Tree Wild	429,690	94-567	USDI-NPS
Kaiser Wild	22,500	94-577	USDA-FS
Kings Canyon NP	459,994	76-424	USDI-NPS
Lassen Volcanic NP	105,800	64-184	USDI-NPS
Lava Beds Wild	28,640	92-493	USDI-NPS
Marble Mountain Wild	213,743	88-577	USDA-FS
Minarets Wild	109,484	88-577	USDA-FS
Mokelumne Wild	50,400	88-577	USDA-FS
Pinnacles Wild	12,952	94-567	USDI-NPS
Point Reyes Wild	25,370	94-544, 94-567	USDI-NPS
Redwood NP	27,792	90-545	USDI-NPS
San Gabriel Wild	36,137	90-318	USDA-FS
San Gorgonio Wild	34,644	88-577	USDA-FS
San Jacinto Wild	20,564	88-577	USDA-FS
San Rafael Wild	142,722	90-271	USDA-FS
Sequoia NP	386,642	(1)	USDI-NPS
South Warner Wild	68,507	88-577	USDA-FS
Thousand Lakes Wild	15,695	88-577	USDA-FS
Ventana Wild	95,152	91-58	USDA-FS
Yolla-Bolly-Middle-Eel Wild	109,091	88-577	USDA-FS
Yosemite NP	759,172	58-49	USDI-NPS

(1) 26 Stat. 478 (51st Cong.)

§ 81.406 Colorado.

Area name	Acreage	Public Law establishing	Federal land manager
Black Canyon of the Gunnison Wild	11,180	94-567	USDI-NPS
Eagles Nest Wild	133,910	94-352	USDA-FS
Flat Tops Wild	235,230	94-146	USDA-FS
Great Sand Dunes Wild	33,450	94-567	USDI-NPS
La Garita Wild	48,486	88-577	USDA-FS
Maroon Bells-Snowmass Wild	71,060	88-577	USDA-FS
Mesa Verde NP	51,488	59-353	USDI-NPS
Mount Zirkel Wild	72,472	98-577	USDA-FS
Rawah Wild	26,674	88-577	USDA-FS
Rocky Mountain NP	263,138	63-238	USDI-NPS
Weminuche Wild	400,907	93-632	USDA-FS
West Elk Wild	61,412	88-577	USDA-FS

§ 81.407 Florida.

Area name	Acreage	Public Law establishing	Federal land manager
Chassahowitzka Wild	23,360	94-557	USDI-FWS
Everglades NP	1,397,429	73-267	USDI-NPS
St. Marks Wild	17,745	93-632	USDI-FWS

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§ 81.408 Georgia.

Area name	Acreage	Public Law establishing	Federal land manager
Cohotta Wild	33,776	93-622	USDA-FS
Okefenokee Wild	343,850	93-429	USDI-FWS
Wolf Island Wild	5,126	93-632	USDI-FWS

§ 81.409 Hawaii.

Area name	Acreage	Public Law establishing	Federal land manager
Haleakala NP	27,208	87-744	USDI-NPS
Hawaii Volcanoes	217,029	64-171	USDI-NPS

§ 81.410 Idaho.

Area name	Acreage	Public Law establishing	Federal land manager
Craters of the Moon Wild	43,243	91-504	USDI-NPS
Hells Canyon Wild	83,800	94-199	USDA-FS
Sawtooth Wild	216,383	92-400	USDA-FS
Selway-Bitterroot Wild[2]	988,770	88-577	USDA-FS
Yellowstone NP[3]	31,488	(3)	USDI-NPS

[1] Hells Canyon Wilderness, 192,700 acres overall, of which 108,900 acres are in Oregon and 83,800 acres are in Idaho.
[2] Selway Bitterroot Wilderness, 1,240,700 acres overall, of which 988,700 acres are in Idaho and 251,930 acres are in Montana.
[3] Yellowstone National Park, 2,219,737 acres overall, of which 2,020,625 acres are in Wyoming, 167,624 acres are in Montana, and 31,488 acres are in Idaho.
[4] 17 Stat. 32 (42nd Cong.)

§ 81.411 Kentucky.

Area name	Acreage	Public Law establishing	Federal land manager
Mammoth Cave NP	51,303	69-283	USDI-NPS

§ 81.412 Louisiana.

Area name	Acreage	Public Law establishing	Federal land manager
Breton Wild	5,000	93-632	USDI-FWS

§ 81.413 Maine.

Area name	Acreage	Public Law establishing	Federal land manager
Acadia NP	37,503	65-278	USDI-NPS
Moosehorn Wild	7,501		USDI-FWS
(Edmunds Unit)	(2,782)	91-504	
(Baring Unit)	(4,719)	93-632	

§ 81.414 Michigan.

Area name	Acreage	Public Law establishing	Federal land manager
Isle Royale NP	542,428	71-835	USDI-NPS
Seney Wild	25,150	91-504	USDI-FWS

§ 81.415 Minnesota.

Area name	Acreage	Public Law establishing	Federal land manager
Boundary Waters Canoe Area Wild	747,840	99-577	USDA-FS
Voyageurs NP	114,964	99-261	USDI-NPS

§ 81.416 Missouri.

Area name	Acreage	Public Law establishing	Federal land manager
Hercules-Glades Wild	12,315	94-557	USDA-FS
Mingo Wild	8,000	94-557	USDI-FWS

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§ 81.417 Montana.

Area name	Acreage	Public Law establishing	Federal land manager
Anaconda-Pintlar Wild.	157,803	88-577	USDA-FS
Bob Marshall Wild.	950,000	88-577	USDA-FS
Cabinet Mountains Wild.	94,272	88-577	USDA-FS
Gates of the Mtn Wild.	28,562	88-577	USDA-FS
Glacier NP.	1,012,599	61-171	USDI-NPS
Medicine Lake Wild.	11,366	94-557	USDI-FWS
Mission Mountain Wild.	73,877	93-632	USDA-FS
Red Rock Lakes Wild.	32,350	94-557	USDI-FWS
Scapegoat Wild.	239,295	92-395	USDA-FS
Selway-Bitterroot Wild.[1]	251,930	88-577	USDA-FS
U. L. Bend Wild.	20,890	94-557	USDI-FWS
Yellowstone NP.[2]	167,624	(3)	USDI-NPS

[1] Selway-Bitterroot Wilderness, 1,240,700 acres overall, of which 988,770 acres are in Idaho and 251,930 acres are in Montana.

[2] Yellowstone National Park, 2,219,737 acres overall, of which 2,020,625 acres are in Wyoming, 167,624 acres are in Montana, and 31,488 acres are in Idaho.

[3] 17 Stat. 32 (42nd Cong.)

[44 FR 69124, Nov. 30, 1979; 45 FR 6103, Jan. 25, 1980]

§ 81.418 Nevada.

Area name	Acreage	Public Law establishing	Federal land manager
Jarbidge Wild.	64,667	88-577	USDA-FS

§ 81.419 New Hampshire.

Area name	Acreage	Public Law establishing	Federal land manager
Great Gulf Wild.	5,552	88-577	USDA-FS
Presidential Range-Dry River Wild.	20,000	93-622	USDA-FS

§ 81.420 New Jersey.

Area name	Acreage	Public Law establishing	Federal land manager
Brigantine Wild.	6,603	93-632	USDI-FWS

§ 81.421 New Mexico.

Area name	Acreage	Public Law establishing	Federal land manager
Bandelier Wild.	23,267	94-567	USDI-NPS
Bosque del Apache Wild.	80,850	93-632	USDI-FWS
Carlsbad Caverns NP.	46,435	71-216	USDI-NPS
Gila Wild.	433,690	88-577	USDA-FS
Pecos Wild.	167,416	88-577	USDA-FS
Salt Creek Wild.	8,500	91-504	USDI-FWS
San Pedro Parks Wild.	41,132	88-577	USDA-FS
Wheeler Peak Wild.	6,027	88-577	USDA-FS
White Mountain Wild.	31,171	88-577	USDA-FS

§ 81.422 North Carolina.

Area name	Acreage	Public Law establishing	Federal land manager
Great Smoky Mountains NP.[1]	273,551	69-268	USDI-NPS
Joyce Kilmer-Slickrock Wild.[2]	10,201	93-622	USDA-FS
Linville Gorge Wild.	7,575	88-577	USDA-FS
Shining Rock Wild.	13,350	88-577	USDA-FS
Swanguarter Wild.	9,000	94-557	USDI-FWS

[1] Great Smoky Mountains National Park, 514,758 acres overall, of which 273,551 acres are in North Carolina, and 241,207 acres are in Tennessee.

[2] Joyce Kilmer-Slickrock Wilderness, 14,033 acres overall, of which 10,201 acres are in North Carolina, and 3,832 acres are in Tennessee.

§ 81.423 North Dakota.

Area name	Acreage	Public Law establishing	Federal land manager
Lostwood Wild.	5,557	93-632	USDI-FWS
Theodore Roosevelt, NMP.	69,675	80-38	USDI-NPS

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§ 81.424 Oklahoma.

Area name	Acreage	Public Law establishing	Federal land manager
Wichita Mountains Wild	8,900	91-504	USDI-FWS

§ 81.425 Oregon.

Area name	Acreage	Public Law establishing	Federal land manager
Crater Lake NP	160,290	57-121	USDA-NPS
Diamond Peak Wild	36,637	88-577	USDA-FS
Eagle Cap Wild	293,476	88-577	USDA-FS
Gearhart Mountain Wild	18,709	88-577	USDA-FS
Hells Canyon Wild [1]	108,900	94-199	USDA-FS
Kalmiopsis Wild	76,900	88-577	USDA-FS
Mountain Lakes Wild	23,071	88-577	USDA-FS
Mount Hood Wild	14,160	88-577	USDA-FS
Mount Jefferson Wild	100,208	90-548	USDA-FS
Mount Washington Wild	46,116	88-577	USDA-FS
Strawberry Mountain Wild	33,003	88-577	USDA-FS
Three Sisters Wild	199,902	88-577	USDA-FS

[1] Hells Canyon Wilderness, 192,700 acres overall, of which 108,900 acres are in Oregon, and 83,800 acres are in Idaho.

§ 81.426 South Carolina.

Area name	Acreage	Public Law establishing	Federal land manager
Cape Romain Wild	28,000	93-632	USDI-FWS

§ 81.427 South Dakota.

Area name	Acreage	Public Law establishing	Federal land manager
Badlands Wild	64,250	94-567	USDI-NPS
Wind Cave NP	28,060	57-16	USDI-NPS

§ 81.428 Tennessee.

Area name	Acreage	Public Law establishing	Federal land manager
Great Smoky Mountains NP [1]	241,207	69-268	USDI-NPS
Joyce Kilmer-Slickrock Wild [2]	3,832	93-622	USDA-FS

[1] Great Smoky Mountains National Park, 514,758 acres overall, of which 273,551 acres are in North Carolina, and 241,207 acres are in Tennessee.

[2] Joyce Kilmer Slickrock Wilderness, 14,033 acres overall, of which 10,201 acres are in North Carolina, and 3,832 acres are in Tennessee.

[44 FR 69124, Nov. 30, 1979; 45 FR 6103, Jan. 25, 1980]

§ 81.429 Texas.

Area name	Acreage	Public Law establishing	Federal land manager
Big Bend NP	708,118	74-157	USDI-NPS
Guadalupe Mountains NP	76,292	89-667	USDI-NPS

§ 81.430 Utah.

Area name	Acreage	Public Law establishing	Federal land manager
Arches NP	65,098	92-155	USDI-NPS
Bryce Canyon NP	35,832	68-277	USDI-NPS
Canyonlands NP	337,570	88-590	USDI-NPS
Capitol Reef NP	221,896	92-507	USDI-NPS
Zion NP	142,462	88-83	USDI-NPS

§ 81.431 Vermont.

Area name	Acreage	Public Law establishing	Federal land manager
Lye Brook Wild	12,430	93-622	USDA-FS

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§ 81.432 Virgin Islands.

Area name	Acreage	Public Law establishing	Federal land manager
Virgin Islands NP	12,295	84-925	USDI-NPS

§ 81.433 Virginia.

Area name	Acreage	Public Law establishing	Federal land manager
James River Face Wild	8,703	93-622	USDA-FS
Shenandoah NP	190,535	69-268	USDI-NPS

§ 81.434 Washington.

Area name	Acreage	Public Law establishing	Federal land manager
Alpine Lakes Wild	303,508	94-357	USDA-FS
Glacier Peak Wild	464,258	88-577	USDA-FS
Goat Rocks Wild	82,680	88-577	USDA-FS
Mount Adams Wild	32,356	88-577	USDA-FS
Mount Rainer NP	235,239	(1)	USDI-NPS
North Cascades NP	503,277	90-554	USDI-NPS
Olympic NP	892,578	75-778	USDI-NPS
Pasayten Wild	505,524	90-544	USDA-FS

[1] 30 Stat. 993 (55th Cong.).

§ 81.435 West Virginia.

Area name	Acreage	Public Law establishing	Federal land manager
Dolly Sods Wild	10,215	93-622	USDA-FS
Otter Creek Wild	20,000	93-622	USDA-FS

§ 81.436 Wyoming.

Area name	Acreage	Public Law establishing	Federal land manager
Bridger Wild	392,160	88-577	USDA-FS
Fitzpatrick Wild	191,103	94-567	USDA-FS
Grand Teton NP	305,504	81-787	USDI-NPS
North Absaroka Wild	351,104	88-577	USDA-FS
Teton Wild	557,311	88-577	USDA-FS
Washakie Wild	686,584	92-476	USDA-FS
Yellowstone NP [1]	2,020,625	(2)	USDI-NPS

[1] Yellowstone National Park, 2,219,737 acres overall, of which 2,020,625 acres are in Wyoming, 167,624 acres are in Montana, and 31,488 acres are in Idaho.
[2] 17 Stat. 32 (42nd Cong.).

§ 81.437 New Brunswick, Canada.

Area name	Acreage	Public Law establishing	Federal land manager
Roosevelt Campobello International Park.	2,721	88-363	(1)

[1] Not applicable.

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APPENDIX A TO PART 81—AIR QUALITY CONTROL REGIONS (AQCRs)

	AQCR No.
Alabama	
Alabama and Tombigbee Rivers	1
Columbus-Phenix City	2
East Alabama	3
Metropolitan Birmingham	4
Mobile-Pensacola-Panama City-Southern Mississippi (Fla., Miss.)	5
Southeast Alabama	6
Tennessee River Valley-Cumberland Mountains (Tenn.)	7
Alaska	
Cook Inlet	8
Northern Alaska	9
South Central Alaska	10
Southeastern Alaska	11
Arizona	
Arizona-New Mexico Southern Border (N. Mex.)	12
Clark-Mohave	13
Four Corners (Colo., N. Mex., Utah)	14
Phoenix-Tucson	15
Arkansas	
Central Arkansas	16
Metropolitan Fort Smith	17
Metropolitan Memphis	18
Monroe-El Dorado (La.)	19
Northeast Arkansas	20
Northwest Arkansas	21
Shreveport-Texarkana-Tyler (La., Okla., Texas)	22
California	
Great Basin Valley	23
Metropolitan Los Angeles	24
North Central Coast	25
North Coast	26
Northeast Plateau	27
Sacramento Valley	28
San Diego	29
San Francisco Bay Area	30
San Joaquin Valley	31
South Central Coast	32
Southeast Desert	33
Colorado:	
Comanche	34
Four Corners (Ariz., N. Mex., Utah)	14
Grand Mesa	35
Metropolitan Denver	36
Pawnee	37
San Isabel	38
San Luis	39
Yampa	40
Connecticut:	
Eastern Connecticut	41
Hartford-New Haven-Springfield (Mass.)	42
New Jersey-New York-Connecticut (N.J., N.Y.)	43
Northwestern Connecticut	44
Delaware:	
Metropolitan Philadelphia (N.J., Pa.)	45
Southern Delaware	46
District of Columbia	
National Capital (Md.)	47
Florida:	
Central Florida	48
Jacksonville-Brunswick (Ga.)	49
Mobile-Pensacola-Panama City-Southern Mississippi (Ala., Miss.)	5
Southeast Florida	50

APPENDIX A TO PART 81—AIR QUALITY CONTROL REGIONS (AQCRs)—Continued

	AQCR No.
Southwest Florida	51
West Central Florida	52
Georgia:	
Augusta-Aiken (S.C.)	53
Central Georgia	54
Chattanooga (Tenn.)	55
Columbus-Phenix City (Ala.)	2
Jacksonville-Brunswick (Fla.)	49
Metropolitan Atlanta	56
Northeast Georgia	57
Savannah-Beaufort (S.C.)	58
Southwest Georgia	59
Hawaii:	
Entire State	60
Idaho:	
Eastern Idaho	61
Eastern Washington-Northern Idaho (Wash.)	62
Idaho	63
Metropolitan Boise	64
Illinois:	
Burlington-Keokuk (Iowa)	65
East Central Illinois	66
Metropolitan Chicago (Ind.)	67
Metropolitan Dubuque (Iowa, Wis.)	68
Metropolitan Quad Cities (Iowa)	69
Metropolitan St. Louis (Mo.)	70
North Central Illinois	71
Paducah-Cairo (Ky.)	72
Rockford-Janesville-Beloit (Wis.)	73
Southeast Illinois	74
West Central Illinois	75
Indiana:	
East Central Indiana	76
Evansville-Owensboro-Henderson (Ky.)	77
Louisville (Ky.)	78
Metropolitan Chicago (Ill.)	67
Metropolitan Cincinnati (Ky., Ohio)	79
Metropolitan Indianapolis	80
Northeast Indiana	81
South Bend-Elkhart-Benton Harbor (Mich.)	82
Southern Indiana	83
Wabash Valley	84
Iowa:	
Burlington-Keokuk (Ill.)	65
Metropolitan Dubuque (Ill., Wis.)	68
Metropolitan Omaha-Council Bluffs (Nebr.)	85
Metropolitan Quad Cities (Ill.)	69
Metropolitan Sioux City (Nebr., S. Dak.)	86
Metropolitan Sioux Falls (S. Dak.)	87
Northeast Iowa	88
North Central Iowa	89
Northwest Iowa	90
Southeast Iowa	91
South Central Iowa	92
Southwest Iowa	93
Kansas:	
Metropolitan Kansas City (Mo.)	94
Northeast Kansas	95
North Central Kansas	96
Northwest Kansas	97
Southeast Kansas	98
South Central Kansas	99
Southwest Kansas	100
Kentucky:	
Appalachian	101
Bluegrass	102
Evansville-Owensboro-Henderson (Ind.)	77

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APPENDIX A TO PART 81—AIR QUALITY CONTROL REGIONS (AQCRs)—Continued

	AQCR No.
Huntington-Ashland-Portsmouth-Ironton (Ohio, W. Va.)	103
Louisville (Ind.)	78
Metropolitan Cincinnati (Ind., Ohio)	79
North Central Kentucky	104
Paducah-Cairo (Ill.)	72
South Central Kentucky	105
Louisiana:	
Monroe-El Dorado (Ark.)	19
Shreveport-Texarkana-Tyler (Ark., Okla., Tex.)	22
Southern Louisiana-Southeast Texas (Tex.)	106
Maine:	
Androscoggin Valley (N.H.)	107
Aroostook	108
Down East	109
Metropolitan Portland	110
Northwest Maine	111
Maryland:	
Central Maryland	112
Cumberland-Keyser (W. Va.)	113
Eastern Shore	114
Metropolitan Baltimore	115
National Capital (D.C.)	47
Southern Maryland	116
Massachusetts:	
Berkshire	117
Central Massachusetts	118
Hartford-New Haven-Springfield (Conn.)	42
Metropolitan Boston	119
Metropolitan Providence (R.I.)	120
Merrimack Valley-Southern New Hampshire (N.H.)	121
Michigan:	
Central Michigan	122
Metropolitan Detroit-Port Huron	123
Metropolitan Toledo (Ohio)	124
South Bend-Elkhart-Benton Harbor (Ind.)	82
South Central Michigan	125
Upper Michigan	126
Minnesota:	
Central Minnesota	127
Southeast Minnesota-La Crosse (Wis.)	128
Duluth-Superior (Wis.)	129
Metropolitan Fargo-Moorhead (N. Dak.)	130
Minneapolis-St. Paul	131
Northwest Minnesota	132
Southwest Minnesota	133
Mississippi:	
Metropolitan Memphis (Ark., Tenn.)	18
Mississippi Delta	134
Mobile-Pensacola-Panama City-Southern Mississippi (Ala., Fla.)	5
Northeast Mississippi	135
Missouri:	
Metropolitan Kansas City (Kans.)	94
Metropolitan St. Louis (Ill.)	70
Northern Missouri	137
Southeast Missouri	138
Southwest Missouri	139
Montana:	
Billings	140
Great Falls	141
Helena	142
Miles City	143
Missoula	144
Nebraska:	
Lincoln-Beatrice-Fairbury	145
Metropolitan Omaha-Council Bluffs (Iowa)	85

APPENDIX A TO PART 81—AIR QUALITY CONTROL REGIONS (AQCRs)—Continued

	AQCR No.
Metropolitan Sioux City (Iowa, S. Dak.)	86
Nebraska	146
Nevada:	
Clark-Mohave (Ariz.)	13
Nevada	147
Northwest Nevada	148
New Hampshire:	
Androscoggin Valley (Maine)	107
Merrimack Valley-Southern New Hampshire (Mass.)	121
New Hampshire	149
New Jersey:	
Metropolitan Philadelphia (Del., Pa.)	45
New Jersey	150
New Jersey-New York-Connecticut (N.Y., Conn.)	43
Northeast Pennsylvania-Upper Delaware Valley (Pa.)	151
New Mexico:	
Albuquerque-Mid Rio Grande	152
Arizona-New Mexico Southern Border (Ariz.)	12
El Paso-Las Cruces-Alamogordo (Tex.)	153
Four Corners (Ariz., Colo., Utah)	14
Northeastern Plains	154
Pecos-Permian Basin	155
Southwestern Mountains-Augustine Plains	156
Upper Rio Grande Valley	157
New York:	
Central New York	158
Champlain Valley (Vt.)	159
Genesee-Finger Lakes	160
Hudson Valley	161
New Jersey-New York-Connecticut (N.J., Conn.)	43
Niagara Frontier	162
Southern Tier East	163
Southern Tier West	164
North Carolina:	
Eastern Mountain	165
Eastern Piedmont	166
Metropolitan Charlotte (S.C.)	167
Northern Coastal Plain	168
Northern Piedmont	136
Sandhills	169
Southern Coastal Plain	170
Western Mountain	171
North Dakota:	
Metropolitan Fargo-Moorhead (Minn.)	130
North Dakota	172
Ohio:	
Dayton	173
Greater Metropolitan Cleveland	174
Huntington-Ashland-Portsmouth-Ironton (Ky., W. Va.)	103
Mansfield-Marion	175
Metropolitan Cincinnati (Ind., Ky.)	79
Metropolitan Columbus	176
Metropolitan Toledo (Mich.)	124
Northwest Ohio	177
Northwest Pennsylvania-Youngstown (Pa.)	178
Parkersburg-Marietta (W. Va.)	179
Sandusky	180
Steubenville-Weirton-Wheeling (W. Va.)	181
Wilmington-Chillicothe-Logan	182
Zanesville-Cambridge	183
Oklahoma:	
Central Oklahoma	184
Metropolitan Fort Smith (Ark.)	17

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APPENDIX A TO PART 81—AIR QUALITY CONTROL REGIONS (AQCRs)—Continued

	AQCR No.
North Central Oklahoma	185
Northeastern Oklahoma	186
Northwestern Oklahoma	187
Shreveport-Texarkana-Tyler (Ark., La., Texas)	22
Southeastern Oklahoma	188
Southwestern Oklahoma	189
Oregon:	
Central Oregon	190
Eastern Oregon	191
Northwest Oregon	192
Portland (Wash.)	193
Southwest Oregon	194
Pennsylvania:	
Central Pennsylvania	195
Metropolitan Philadelphia (Del., N.J.)	45
Northeast Pennsylvania-Upper Delaware Valley (N.J.)	151
Northwest Pennsylvania-Youngstown (Ohio)	178
South Central Pennsylvania	196
Southwest Pennsylvania	197
Rhode Island:	
Metropolitan Providence (Mass.)	120
South Carolina:	
Augusta-Aiken (Ga.)	53
Camden-Sumter	198
Charleston	199
Columbia	200
Florence	201
Greenville-Spartanburg	202
Greenwood	203
Georgetown	204
Metropolitan Charlotte (N.C.)	167
Savannah-Beaufort (Ga.)	58
South Dakota:	
Black Hills-Rapid City	205
Metropolitan Sioux City (Iowa, Neb.)	86
Metropolitan Sioux Falls (Iowa)	87
South Dakota	206
Tennessee:	
Chattanooga (Ga.)	55
Eastern Tennessee-Southwestern Virginia (Va.)	207
Metropolitan Memphis (Ark., Miss.)	18
Middle Tennessee	208
Tennessee River Valley-Cumberland Mountains (Ala.)	7
Western Tennessee	209
Texas:	
Abilene-Wichita Falls	210
Amarillo-Lubbock	211
Austin-Waco	212
Brownsville-Laredo	213
Corpus Christi-Victoria	214
El Paso-Las Cruces-Alamagordo (N. Mex.)	153
Metropolitan Dallas-Ft. Worth	215
Metropolitan Houston-Galveston	216
Metropolitan San Antonio	217
Midland-Odessa-San Angelo	218
Shreveport-Texarkana-Tyler (Ark., La., Okla.)	22
Southern Louisiana-Southeast Texas (La.)	106
Utah:	
Four Corners (Ariz., Colo., N. Mex.)	14
Utah	219
Wasatch Front	220
Vermont:	
Champlain Valley (N.Y.)	159
Vermont	221
Virginia:	
Central Virginia	222

APPENDIX A TO PART 81—AIR QUALITY CONTROL REGIONS (AQCRs)—Continued

	AQCR No.
Eastern Tennessee-Southwestern Virginia (Tenn.)	207
Hampton Roads	223
National Capital (D.C., Md.)	47
Northeastern Virginia	224
State Capital	225
Valley of Virginia	226
Washington:	
Eastern Washington-Northern Idaho (Idaho)	62
Northern Washington	227
Olympia-Northwest Washington	228
Portland (Ore.)	193
Puget Sound	229
South Central Washington	230
West Virginia:	
Allegheny	231
Central West Virginia	232
Cumberland-Keyser (Md.)	113
Eastern Panhandle	233
Huntington-Ashland-Portsmouth-Iron- ton (Ky., Ohio)	103
Kanawha Valley	234
North Central West Virginia	235
Parkersburg-Marietta (Ohio)	179
Southern West Virginia	236
Steubenville-Wierton-Wheeling (Ohio)	181
Wisconsin:	
Duluth-Superior (Minn.)	129
Lake Michigan	237
Metropolitan Dubuque (Ill., Iowa)	68
North Central Wisconsin	238
Rockford-Janesville-Beloit (Ill.)	73
Southeastern Wisconsin	239
Southeast Minnesota-La Crosse (Minn.)	128
Southern Wisconsin	240
Wyoming:	
Casper	241
Metropolitan Cheyenne	242
Wyoming	243
Puerto Rico:	
Puerto Rico	244
American Samoa:	
American Samoa	245
Guam:	
Guam	246
U.S. Virgin Islands:	
U.S. Virgin Islands	247

PART 85—CONTROL OF AIR POLLUTION FROM MOTOR VEHICLES AND MOTOR VEHICLE ENGINES

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85.402 Definitions.

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85.404 Manufacturer's research program.
85.405 Annual research period plan.
85.406 Conduct of the research program.
85.407 Annual report.
85.408 Treatment of confidential information.

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85.1503 Admission pending certification.
85.1504 Admission pending modification.
85.1505 Admission pending receipt of information.
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85.1509 Admission of catalyst-equipped vehicles.

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85.1702 Definitions.
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85.1706 National security exemption.
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85.1708 Granting of exemptions.
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85.1803 Remedial Plan.
85.1804 Approval of Plan: Implementation.
85.1805 Notification to vehicle or engine owners.
85.1806 Records and reports.
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85.1902 Definitions.
85.1903 Emissions defect information report.
85.1904 Voluntary emissions recall report; quarterly reports.
85.1905 Alternative report formats.
85.1906 Report filing: Record retention.
85.1907 Responsibility under other legal provisions preserved.
85.1908 Disclaimer of production warranty applicability.

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85.2103 Emission performance warranty .
85.2104 Owners' compliance with instructions for proper maintenance and use.
85.2105 Replacement parts.
85.2106 Warranty claim procedures.
85.2107 Warranty remedy.
85.2108 Dealer certification.
85.2109 Inclusions of warranty provisions in owners' manuals and warranty booklets.
85.2110 Submission of owner manuals and warranty statement to EPA.
85.2111 Warranty enforcement.
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85.2204-81 Short test standards for 1981 and later model year light-duty trucks.
85.2205—85.2210 [Reserved]
85.2211 Alternative standards and procedures.
85.2212 Idle test.
85.2213 Two-speed idle test.
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Sec.
85.2218 Test report.

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APPENDIX VIII—VEHICLE AND ENGINE PARAMETERS AND SPECIFICATIONS

AUTHORITY: Secs. 202, 206, and 301(a) of the Clean Air Act, as amended (42 U.S.C. 1857f-1, 1857f-5, and 1857g(a)).

EDITORIAL NOTE: Subparts A-D, H-J and Appendices I-VI were removed at 42 FR 36457, effective July 15, 1977. This action deletes the emission regulations applicable to 1976 and earlier model year vehicles and engines and therefore are not being retained in the annual compilation of the CFR since they are no longer applicable to ongoing certification of new motor vehicles and new motor vehicle engines.

Subparts A-D—[Reserved]

Subpart E—Oxides of Nitrogen Research Program for the 1981 and Subsequent Model Years

AUTHORITY: Secs. 202, 208, and 301(a) of the Clean Air Act, as amended (42 USC 7521, 7542 and 7601(a)).

SOURCE: 45 FR 67579, Oct. 10, 1980, unless otherwise noted.

§ 85.401 Scope.

The provisions of this subpart establish an oxides of nitrogen research program and require the participation of certain light-duty vehicle manufacturers.

§ 85.402 Definitions.

The terms used in this subpart shall have the meaning established in the Clean Air Act and 40 CFR Part 86. The following definition shall also apply:

"Annual research period" means the time period from August 1 of a previous calendar year to July 31 of the given calendar year, e.g., the 1981 annual research period would be the time period from August 1, 1980 to July 31, 1981.

§ 85.403 Manufacturers' participation.

(a) Each manufacturer whose sales are determined by the Administrator to represent at least 0.5 per centum of light-duty motor vehicle sales in the United States is required to comply with the provisions of this subpart beginning in the 1981 annual research period.

(b) Sales figures submitted to determine Corporate Average Fuel Economy will be used to determine which manufacturers must participate.

(c) Manufacturers will be notified in writing of the Administrator's determination; such notification will apply to subsequent research periods until rescinded. Upon written request, the Administrator will make a new determination considering any relevant sales data supplied by a manufacturer.

(d) A manufacturer may elect to have sales determined under parpagraph (b) of this section reduced by the number of complete engines and emission control systems supplied by another manufacturer who participates in the Oxides of Nitrogen Research Program.

§ 85.404 Manufacturers' research program.

(a) Each manufacturer who is subject to these regulations shall institute a research program to achieve the following objectives:

(1) The development of propulsion systems and emission control technology to achieve the research objective of 0.41 gram per mile oxides of nitrogen.

(2) The construction and demonstration, for each annual research period, of the operation of light-duty motor vehicles that meet the research objective of paragraph (a)(1) of this section and that meet all other applicable emission standards or requirements under the Clean Air Act. The most stringent hydrocarbon, carbon monoxide, evaporative emissions and other emissions standards and/or requirements established by regulation or statute prior to the start of an annual research period for a future model year shall apply. Demonstrations shall include emissions and fuel economy testing.

(b) The demonstration vehicles under paragraph (a)(2) of this section shall:

(1) Be designed to encourage the development of new powerplants and emission control technologies that are fuel efficient.

(2) Be within or be reasonably expected to be within the productive capability of the manufacturers; and

(3) Use optimum engine, fuel and emission control systems.

§ 85.405 Annual research period plan.

(a) Not later than October 1 of each annual research period, the manufacturer shall provide the Administrator three (3) copies of an annual research program plan that contains the information specified in paragraphs (b), (c) and (d) of this section. Two (2) copies shall be sent to:

Director, Emission Control Technology Division, U.S. Environmental Protection Agency, 2565 Plymouth Road, Ann Arbor, MI. 48105.

One (1) copy, less any material claimed to be confidential shall be sent to:

U.S. Environmental Protection Agency, Public Information Reference Unit, (PM-213), 401 M Street SW., Washington, D.C. 20460.

(b) Each plan shall contain a description and discussion of:

(1) The manufacturers' long-term, interim, and short-term NOx research and development goals. Long-term goals are more than 4 years beyond the end of the annual research period. Interim goals are those applicable between 0 and 4 years beyond the end of the annual period, and short-term goals are those applicable to the annual research period for which the plan applies.

(2) The specific problems that exist, or are expected to exist, in the development and demonstration of vehicles that achieve the objectives of § 85.404.

(3) The relationship of the goals in paragraph (b)(1) of this section to the problems identified in paragraph (b)(2) of this section and to the objectives of § 85.404; and

(4) The resources, in terms of personnel, capital expenditures, materials, and contracted efforts the manufacturers intend to allocate to the research program. Planned resources expenditures shall be estimated for the current and each future annual period contained in the plan. A "contact person" name, address and telephone number shall be included.

(c) Each plan shall contain a brief discussion of how the research program, established to comply with this subpart, interfaces with other programs conducted by the manufacturer, including contracts with the Federal Government. There should be a general discussion of such programs which includes but is not limited to:

(1) The manufacturer's overall low emissions research and development program, including but not limited to programs for meeting state requirements, unregulated emissions, emissions at high altitude, evaporative emissions, and particulate emissions;

(2) Fuel economy improvement programs;

(3) Vehicle driveability and performance programs; and

(4) Alternate engine programs.

(d)(1) The plan shall identify and fully describe each project and the purposes of each project the manufacturer plans to conduct or sponsor, including but not limited to research efforts in:

(i) Catalyst development and evaluation programs;

(ii) Fuel metering development and evaluation programs;

(iii) EGR development and evaluation programs;

(iv) Air injection development and evaluation programs;

(v) Development and evaluation programs for heat conservation;

(vi) Ignition system development and evaluation programs;

(vii) Development and evaluation programs for combustion or combustion chamber modifications;

(viii) Electronic control system/component development and evaluation programs;

(ix) New powerplant programs, such as those related to stratified charge engines, Diesel engines, gas turbine engines, and Stirling engines.

(2) The plan shall provide the following additional information about projects planned to be conducted during the research period to which the plan applies:

(i) A schedule for the initiation and completion of major outputs;

(ii) Detailed discussion of anticipated technical problems; and

(iii) For demonstration vehicles: a description of each vehicle, the number and type(s) of tests to be performed, and a description of the engine, fuel system components and emission control system to be used on each vehicle.

§ 85.406 Conduct of the research program.

(a) Nothing in this subpart shall be construed as limiting the scope, or direction of a manufacturer's plan, the manufacturer's decision-making ability, or the manufacturer's responsibility to conduct the research plan.

(b) Manufacturers shall build and test vehicle that employ technology which is consistent with the objectives of section 404 of this subpart. Testing shall include but is not limited to regulated emissions and fuel economy.

(c) Upon reasonable notice from EPA, manufacturers shall provide periodic briefings and/or reports for the Administrator regarding the status of the activities being conducted during the research period. Such briefings, and/or reports will be requested not more frequently than quarterly, and will be limited to vehicle emission and fuel economy data, discussion and interpretation of that data, important events during the reporting period, significant program changes, and other indications of status, progress, or lack of progress in meeting the objectives of the research and development effort.

(d) At the Administrator's request, the manufacturer shall provide demonstration vehicles for testing by EPA.

(e) The manufacturer shall notify the Administrator of any major changes to the plan including, but not limited to, the decision to discontinue mileage accumulation on a vehicle prior to the accumulation of all planned mileage, and/or to destroy a vehicle or significant prototype test hardware. The manufacturer shall provide an opportunity for the Administrator to test or inspect such vehicles and/or hardware prior to discontinuation or destruction.

§ 85.407 Annual Report.

(a) Each manufacturer shall provide three (3) copies of an annual report that contains the information required by paragraph (b) of this section no later than October 1 after the close of the research period. The annual report may be combined with the annual research plan required by § 85.405 for the following annual research period. Reports shall be submitted in the same manner and to the same addresses as research plans, see § 85.405 paragraph (a).

(b) The annual report shall include the following:

(1) A summary of the work conducted, conclusions about the success or failure of each project, a discussion of the implications for future efforts of the research and development activities conducted, a comparison of actual accomplishments to those planned, and identification and discussion of significant problems areas.

(2) A list of projects conducted, a discussion of the relationship of the projects to the goals of the plan submitted pursuant to § 85.405 of this subpart, and a discussion of the influence that research and development efforts in programs identified under § 85.405(c) had on the efforts conducted under this subpart.

(3) A description of how the original plan was modified during the annual research period and the basis and rational for such modification.

(4) A description of each demonstration vehicle constructed under § 85.406, including a description of each engine, emission control system, and fuel system component used, all test data generated during the annual research period from the demonstration vehicles including but not limited to testing for regulated and unregulated emissions, fuel economy, driveability, and performance.

(5) An identification of any vehicle(s) which the manufacturer considers to represent the best relationship among emissions, fuel economy, driveability, performance, cost, reliability, maintainability, producibility and other factors of importance to the manufacturer, i.e., a fully optimized vehicle.

(6) A description of other programs, including those conducted with outside organizations, that generated test data that involve emissions, including but not limited to: Engine dynamo-

meter testing, optimization programs, catalyst screening testing, and component testing. Representative data and conclusions from these programs shall be submitted, and impacts of these programs on future vehicle testing shall be discussed.

(7) Description of the fuel economy implications of the use of the types of technology used during the annual research period, specifically including a description of the fleet of vehicles that could be manufactured four (4) years in the future. The hypothetical fleet shall be described in terms of the sales mix, inertia weight, engine, transmission, axle ratio, and the emission control system assumed for each type of vehicle.

(8) An identification of the resources expended during the research period and a comparison of those expenditures to those in the plan submitted under § 85.405.

§ 85.108 Treatment of confidential information.

(a) Any manufacturer may assert that some or all of the information submitted pursuant to this subpart is entitled to confidential treatment as provided by 40 CFR, Part 2, Subpart B.

(b) To assert that information submitted pursuant to this subpart is confidential, a manufacturer must submit such information on separate pages which are clearly marked employing language such as "Trade Secret", "Proprietary", "Company Confidental", and which are easily detached from the document, and provide a separate section labeled "Confidential Business Information" in which the number of each page on which confidential information appears shall be identified.

(c) If a claim is made that some or all of the information is entitled to confidential treatment, the information covered by that confidentiality claim will be disclosed by the Administrator only to the extent and by means of the procedures set forth in Part 2, Subpart B, of this chapter.

(d) Information provided without a claim of confidentiality at the time of submission may be made available to the public by EPA without further notice.

Subparts F–O—[Reserved]

Subpart P—Importation of Motor Vehicles and Motor Vehicle Engines

SOURCE: 37 FR 24314, Nov. 15, 1972, unless otherwise noted.

§ 85.1501 Applicability.

(a) The provisions of this subpart are applicable to new motor vehicles and new motor vehicle engines which are offered for importation or imported into the United States by any person. As used in this subpart, "new motor vehicles" and "new motor vehicle engines" mean new and used motor vehicles or engines manufactured after the effective date of a regulation issued under section 202 of the Act which is applicable to such vehicles or engines (or which would have been applicable to such vehicles or engines had they been manufactured for importation into the United States). The term "United States" means the customs territory of the United States as defined in 19 U.S.C. 1202, and the Virgin Islands, Guam, and American Samoa.

(b) Regulations prescribing further procedures for entry of motor vehicles and motor vehicle engines into the customs territory of the United States, as defined in 19 U.S.C. 1202, are set forth in 19 CFR 12.73.

§ 85.1502 Admission for testing.

A motor vehicle or motor vehicle engine offered for importation or imported pursuant to 19 CFR 12.73(b)(5)(vi), solely for purposes of testing, may be operated on the public streets or highways for a period not to exceed 1 year from the date of importation if the importer or consignee receives prior written approval of such operation from the Administrator. Requests for such approval shall be in writing, and shall briefly describe the proposed testing program, including the estimated duration of such program.

§ 85.1503 Admission pending certification.

A motor vehicle or motor vehicle engine offered for importation or imported pursuant to 19 CFR 12.73(b)(5)(ix) under a declaration that it is one of a class of vehicles or engines represented by test vehicles or engines for which an application for certification of conformity with Federal motor vehicle emission standards is pending before the Administrator may be conditionally admitted into the United States, but shall be refused final admission unless:

(a) Not later than 5 days following such conditional admission the importer or consignee has submitted to the Administrator a written request that such vehicle or engine be permitted conditional admission pending certification of the test vehicle which represents the class of vehicles or engines to which such vehicle or engine belongs, which request shall contain the following:

(1) Identification of the test vehicle or engine which represents such vehicle or engine;

(2) Identification of the place where such vehicle or engine will be stored while the application for certification is pending before the Administrator: *Provided,* That such vehicle or engine shall not be stored on the premises of, or subject to access by or control of, any dealer;

(3) An acknowledgment of responsibility for the custody of the vehicle or engine while certification is pending; and

(b) The Administrator has issued the requested certificate of conformity.

§ 85.1504 Admission pending modification.

Any motor vehicle or motor vehicle engine offered for importation or imported pursuant to 19 CFR 12.73(b)(5)(x) under a declaration that it is not covered by a certificate of conformity with Federal motor vehicle emission standards may be conditionally admitted into the United States, but shall be refused final admission unless:

(a) Not later than 5 days following such conditional admission, the importer or consignee has submitted to the Administrator a written request that he be allowed to modify the vehicle or engine so that it will be in conformity with applicable emission standards, which request shall contain the following:

(1) A statement, acceptable to the Administrator, that specifies the modifications which are necessary to render the vehicle or engine in conformity with a test vehicle or engine for which a certificate of conformity has been issued; or, if the vehicle or engine cannot be modified to bring it within a class of vehicles or engines represented by a test vehicle or engine for which a certificate of conformity has been issued, the request shall state that the importer or consignee will demonstrate that the vehicle or engine is in conformity with applicable emission standards by testing the vehicle or engine or causing it to be tested in accordance with test procedures prescribed under section 206 of the Act in effect during (and applicable to) the model year of such vehicle.

(2) The date by which the modifications will be accomplished;

(3) Identification of the place where the vehicle or engine will be stored pending a determination of conformity under this paragraph: *Provided,* That such vehicle or engine shall not be stored on the premises of, or subject to access by or control of any dealer;

(4) An acknowledgement of responsibility for the custody of the vehicle or engine while the modifications are being made and while a determination of conformity is pending;

(5) Authorization for representatives of the Environmental Protection Agency to inspect or test the vehicle or engine at any reasonable time for the purpose of making a determination of conformity; and

(b) The Administrator has issued a written determination stating that the vehicle or engine is in conformity with Federal motor vehicle emission standards.

(Secs. 203, 301(a) of the Clean Air Act, as amended (42 U.S.C. 1857f-2))

[37 FR 24314, Nov. 15, 1972, as amended at 42 FR 36456, July 15, 1977]

§ 85.1505 Admission pending receipt of information.

Any motor vehicle or motor vehicle engine offered for importation or imported pursuant to 19 CFR 12.73(b)(5)(xi) under a declaration that the importer or consignee does not possess sufficient information to make a knowledgable declaration may be conditionally admitted into the United States, but shall be refused final admission unless:

(a) Not later than 5 days following such conditional admission, the importer or consignee has submitted to the Administrator a written request that such vehicle or engine be permitted entry pending receipt of sufficient information to determine whether such vehicle or engine is covered by a certificate of conformity, and what modifications or testing, if any, are required to bring the vehicle or engine into conformity with applicable emission standards, which request shall contain the following:

(1) Identification of the place where the vehicle or engine will be stored while the receipt of the information is pending: *Provided,* That such vehicle shall not be stored on the premises of or subject to access by or control of, any dealer; and

(2) An acknowledgment of responsibility for the custody of the vehicle or engine during the period; and

(b) The importer or consignee redeclares the vehicle in accordance with 19 CFR 12.73(b)(5)(i) through (x).

§ 85.1506 Waiver of conditions of admission.

Upon the written request of the importer or consignee, and for good cause shown, the Administrator may waive any of the conditions of admission set forth in §§ 85.1502, 85.1503(a), 85.1504(a), and 85.1505(a), and may give written consent to admission of a vehicle or engine upon such terms and conditions as the Administrator may specify.

§ 85.1507 Storage and prohibited operation or sale of vehicles or engines conditionally admitted.

A motor vehicle or engine conditionally admitted pursuant to § 85.1503, § 85.1504, or § 85.1505 shall be stored and shall not be operated on the public highways or sold until such vehicle or engine has been granted final admission. Failure to comply with this provision shall constitute a violation of section 203(a)(1) of the Clean Air Act, as amended.

§ 85.1508 Prohibited importation; penalties.

(a) The importation of any motor vehicle or motor vehicle engine otherwise than in accordance with any applicable provisions of this subpart and the bonding and entry regulations of the Bureau of Customs set forth in 19 CFR 12.73 is prohibited.

(b) Any vehicle or engine conditionally admitted pursuant to § 85.1503, § 85.1504, or § 85.1505 and not granted final admission within 90 days of such conditional admission, or within such additional time as the Bureau of Customs may allow for good cause shown pursuant to 19 CFR 12.73(c), shall be deemed to be unlawfully imported into the United States in violation of section 203(a)(1) of the Clean Air Act unless such vehicle or engine shall have been delivered to the Bureau of Customs for export or other disposition under applicable Customs laws and regulations. Any importer or consignee who violates section 203(a)(1) of the Clean Air Act is subject to a civil penalty of not more than $10,000 for each violation. In addition to the penalty provided in the Clean Air Act, any importer or consignee who fails to deliver such vehicle or engine to the Bureau of Customs is liable for liquidated damages in the amount of the bond required by applicable Customs laws and regulations.

§ 85.1509 Admission of catalyst-equipped vehicles.

(a) Any vehicle is imported or offered for importation which:

(1) Was covered by a certificate of conformity at the time of manufacture;

(2) Was certified with a catalytic converter emission control system;

(3) Is labeled in accordance with 40 CFR Subpart A or C; and

(4) Has been driven outside the United States, Canada and Mexico

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must be entered under bond pursuant to 19 CFR 12.73(b)(5)(x) and 40 CFR 85.1504 unless that vehicle is included in a catalyst control program approved by the Administrator upon such terms as may be deemed appropriate. Catalyst control programs conducted by manufacturers will be approved each model year.

(b) For the purpose of this paragraph, "catalyst control program" means a program instituted and maintained by a manufacturer, or any other U.S. Government Agency for the purpose of preservation, replacement, or initial installation of catalytic converters and, if applicable, restricted filler inlets.

(c) For the purpose of this paragraph, "driven outside the United States Canada and Mexico" does not include mileage accumulated on vehicles solely under the control of manufacturers of new motor vehicles for the purpose of vehicle testing and adjustment, and preparation for shipment to the United States.

[40 FR 27453, June 30, 1975]

Subpart Q—[Reserved]

Subpart R—Exclusion and Exemption of Motor Vehicles and Motor Vehicle Engines

AUTHORITY: Secs. 208(b)(1), 216(2), and 301 of the Clean Air Act (42 U.S.C. 7522, 7550, and 7061).

SOURCE: 39 FR 32611, Sept. 10, 1974, unless otherwise noted.

§ 85.1701 General applicability.

(a) The provisions of this subpart regarding exemption are applicable to new and in-use motor vehicles and motor vehicle engines.

(b) The provisions of this subpart regarding exclusion are applicable after the effective date of these regulations.

§ 85.1702 Definitions.

(a) As used in this subpart, all terms not defined herein shall have the meaning given them in the Act:

(1) "Export exemption" means an exemption granted by statute under section 203(b)(3) of the Act for the purpose of exporting new motor vehicles or new motor vehicle engines.

(2) "National security exemption" means an exemption which may be granted under section 203(b)(1) of the Act for the purpose of national security.

(3) "Pre-certification vehicle" means an uncertified vehicle which a manufacturer employs in fleets from year to year in the ordinary course of business for product development, production method assessment, and market promotion purposes, but in a manner not involving lease or sale.

(4) "Pre-certification vehicle engine" means an uncertified heavy duty engine used in a vehicle which a manufacturer employs in fleets from year to year in the ordinary course of business for product development, production method assessment, and market promotion purposes, but in a manner not involving lease or sale.

(5) "Testing exemption" means an exemption which may be granted under section 203(b)(1) for the purpose of research investigations, studies, demonstrations or training, but not including national security.

[39 FR 32611, Sept. 10, 1974, as amended at 45 FR 13733, Mar. 3, 1980]

§ 85.1703 Application of section 216(2).

(a) For the purpose of determining the applicability of section 216(2), a vehicle which is self-propelled and capable of transporting a person or persons or any material or any permanently or temporarily affixed apparatus shall be deemed a motor vehicle, unless any one or more of the criteria set forth below are met, in which case the vehicle shall be deemed not a motor vehicle and excluded from the operation of the Act:

(1) The vehicle cannot exceed a maximum speed of 25 miles per hour over level, paved surfaces; or

(2) The vehicle lacks features customarily associated with safe and practical street or highway use, such features including, but not being limited to, a reverse gear (except in the case of motorcycles), a differential, or safety features required by state and/or federal law; or

(3) The vehicle exhibits features which render its use on a street or highway unsafe, impractical, or highly unlikely, such features including, but not being limited to, tracked road contact means, an inordinate size, or features ordinarily associated with military combat or tactical vehicles such as armor and/or weaponry.

(b) The Administrator will, from time to time, publish in the FEDERAL REGISTER a list of vehicles which have been determined to be excluded. This list will be in Appendix VI of 40 CFR Part 85.

[39 FR 32611, Sept. 10, 1974, as amended at 45 FR 13733, Mar. 3, 1980]

§ 85.1704 Who may request an exemption.

(a) Any person may request a testing exemption.

(b) Any manufacturer may request a national security exemption under § 85.1706.

(c) Manufacturers may exempt, without application, vehicles or engines as provided by § 85.1707.

[45 FR 13733, Mar. 3, 1980]

§ 85.1705 Testing exemption.

(a) Any person requesting a testing exemption must demonstrate the following:

(1) That the proposed test program has a purpose which constitutes an appropriate basis for an exemption in accordance with section 203(b)(1);

(2) That the proposed test program necessitates the granting of an exemption;

(3) That the proposed test program exhibits reasonableness in scope; and

(4) That the proposed test program exhibits a degree of control consonant with the purpose of the program and the Environmental Protection Agency's (hereafter EPA) monitoring requirements. Paragraphs (b), (c), (d), and (e) of this section describe what constitutes a sufficient demonstration for each of the four above identified elements.

(b) With respect to the purpose of the proposed test program, an appropriate purpose is one which is consistent with one or more of the bases for exemption set forth under section 203(b)(1), namely, research, investigations, studies, demonstrations, or training, but not including national security. A concise statement of purpose is a required item of information.

(c) With respect to the necessity that an exemption be granted, necessity arises from an inability to achieve the stated purpose in a practicable manner without performing or causing to be performed one or more of the prohibited acts under section 203(a). In appropriate circumstances time constraints may be a sufficient basis for necessity, but the cost of certification alone, in the absence of extraordinary circumstances, is not a basis for necessity.

(d) With respect to reasonableness, a test program must exhibit a duration of reasonable length and affect a reasonable number of vehicles or engines. In this regard, required items of information include:

(1) An estimate of the program's duration;

(2) The maximum number of vehicles or engines involved; and

(3) For manufacturers, the fraction of the applicant's total sales represented by the absolute number of (2).

(e) With respect to control, the test program must incorporate procedures consistent with the purpose of the test and be capable of affording EPA monitoring capability. As a minimum, required items of information include:

(1) The technical nature of the test;

(2) The site of the test;

(3) The time or mileage duration of the test;

(4) The ownership arrangement with regard to the vehicles or engines involved in the test;

(5) The intended final disposition of the vehicles or engines;

(6) The manner in which vehicle identification numbers or the engine serial numbers will be identified, recorded, and made available; and

(7) The means or procedure whereby test results will be recorded.

(f) Paragraph (a) of this section applies irrespective of the engine's or vehicle's place of manufacture.

(g) Where an uncertified vehicle or engine is a display vehicle or engine to be used solely for display purposes, will not be operated on the public streets or highways except for that op-

eration incident and necessary to the display purpose, and will not be sold unless an applicable certificate of conformity has been received, no request for exemption of the vehicle or engine is necessary.

(h) Paragraph (a) of this section does not apply for pre-certification vehicles or pre-certification engines. In such cases a request for exemption is necessary; however, the only information required is a statement setting forth the general nature of the fleet activities, the number of vehicles involved, and a demonstration that adequate record keeping procedures for control purposes will be employed.

[39 FR 32611, Sept. 10, 1974, as amended at 45 FR 13733, Mar. 3, 1980]

§ 85.1706 National security exemption.

A manufacturer requesting a national security exemption must state the purpose for which the exemption is required and the request must be endorsed by an agency of the Federal Government charged with responsibility for national defense.

§ 85.1707 Export exemptions.

(a) A new motor vehicle or new motor vehicle engine intended solely for export, and so labeled or tagged on the outside of the container and on the vehicle or engine itself, shall be subject to the provisions of section 203(a) of the Act, unless the importing country has new motor vehicle emission standards which differ from the USEPA standards.

(b) For the purpose of paragraph (a) of this section, a country having no standards, whatsoever, is deemed to be a country having emission standards which differ from USEPA standards.

(c) EPA shall periodically publish in the FEDERAL REGISTER a list of foreign countries which have in force emissions standards identical to USEPA standards and have so notified EPA. New motor vehicles or new motor vehicle engines exported to such countries shall comply with USEPA certification regulations.

(d) It is a condition of any exemption for the purpose of export under section 203(b)(3) of the Act, that such exemption shall be void ab initio with respect to a new motor vehicle or new motor vehicle engine intended solely for export where:

(1) Such motor vehicle or motor vehicle engine is sold, or offered for sale, to an ultimate purchaser in the United States for purposes other than export; and

(2) The motor vehicle or motor vehicle engine manufacturer had reason to believe that any such vehicle would be sold or offered for sale as described in paragraph (d)(1) of this section.

§ 85.1708 Granting of exemptions.

(a) If upon completion of the review of an exemption request, the granting of an exemption is deemed appropriate, a memorandum of exemption will be prepared and submitted to the person requesting the exemption. The memorandum will set forth the basis for the exemption, its scope, and such terms and conditions as are deemed necessary. Such terms and conditions will generally, include, but are not limited to, agreements by the applicant to conduct the exempt activity in the manner described to EPA, create and maintain adequate records accessible to EPA at reasonable times, employ labels for the exempt engines or vehicles setting forth the nature of the exemption, take appropriate measures to assure that the terms of the exemption are met, and advise EPA of the termination of the activity and the ultimate disposition of the vehicles or engines.

(b) Any exemption granted pursuant to paragraph (a) of this section shall be deemed to cover any subject vehicle or engine only to the extent that the specified terms and conditions are complied with. A breach of any term or condition shall cause the exemption to be void ab initio with respect to any vehicle or engine. Consequently, the causing or the performing of an act prohibited under sections 203(a) (1) or (3) of the Clean Air Act other than in strict conformity with all terms and conditions of this exemption shall render the person to whom the exemption is granted, and any other person to whom the provisions of section 203 are applicable, liable to suit under sections 204 and 205 of the Act.

[39 FR 32611, Sept. 10, 1974, as amended at 45 FR 13733, Mar. 3, 1980]

§ 85.1709 Submission of exemption requests.

Requests for exemption or further information concerning exemptions and/or the exemption request review procedure should be addressed to:

Director
Manufacturers Operations Division
Environmental Protection Agency
401 M Street, S.W.,
Washington, D.C. 20460

[39 FR 32611, Sept. 10, 1974, as amended at 44 FR 61962, Oct. 29, 1979]

Subpart S—Recall Regulations

AUTHORITY: Sec. 301(a), Clean Air Act, 81 Stat. 504, as amended by sec. 15(c), 84 Stat. 1713 (42 U.S.C. 1857g(a)). The regulations implement sec. 207(c) (1)-(2), Clean Air Act, 84 Stat. 1697 (42 U.S.C. 1847f-5a(c)(1)-(2)); sec. 208(a), Clean Air Act, 81 Stat. 501, as renumbered by sec. 8(a), 84 Stat. 1694 (42 U.S.C. 1857f-6(a)), unless otherwise noted.

SOURCE: 39 FR 44375, Dec. 23, 1974, unless otherwise noted.

§ 85.1801 Definitions.

For the purposes of this subpart, except as otherwise provided, words shall be defined as provided for by sections 214 and 302 of the Clean Air Act, 42 U.S.C. 1857, as amended.

(a) "Act" shall mean the Clean Air Act, 42 U.S.C. 1857, as amended.

(b) "Days" shall mean calendar days.

§ 85.1802 Notice to manufacturer of nonconformity; submission of Remedial Plan.

(a) A manufacturer will be notified whenever the Administrator has determined that a substantial number of a class or category of vehicles or engines produced by that manufacturer, although properly maintained and used, do not conform to the regulations prescribed under section 202 of the Act in effect during (and applicable to) the model year of such vehicle. The notification will include a description of each class or category of vehicles or engines encompassed by the determination of nonconformity, will give the factual basis for the determination of nonconformity (except information previously provided the manufacturer by the Agency), and will designate a date, no sooner than 45 days from the date of receipt of such notification, by which the manufacturer shall have submitted a plan to remedy the nonconformity.

(b) Unless a hearing is requested pursuant to § 85.1807, the remedial plan shall be submitted to the Administrator within the time limit specified in the Administrator's notification, provided that the Administrator may grant the manufacturer an extension upon good cause shown.

(c) If a manufacturer requests a public hearing pursuant to § 85.1807, unless as a result of such hearing the Administrator withdraws his determination of nonconformity, the manufacturer shall submit the remedial plan within 30 days of the end of such hearing.

[39 FR 44375, Dec. 23, 1974, as amended at 42 FR 36456, July 15, 1977]

§ 85.1803 Remedial Plan.

(a) When any manufacturer is notified by the Administrator that a substantial number of any class or category of vehicles or engines, although properly maintained and used, do not conform to the regulations (including emission standards) promulgated under section 202 of the Act and in effect during (and applicable to) the model year of such class or classes of vehicles or engines, the manufacturer shall submit a plan to the Administrator to remedy such nonconformity. The plan shall contain the following:

(1) A description of each class or category of vehicle or engine to be recalled including the model year, the make, the model, and such other information as may be required to identify the vehicles or engines to be recalled.

(2) A description of the specific modifications, alterations, repairs, corrections, adjustments or other changes to be made to bring the vehicles or engines into conformity including a brief summary of the data and technical studies which support the manufacturer's decision as to the particular remedial changes to be used in correcting the nonconformity.

(3) A description of the method by which the manufacturer will determine the names and addresses of vehicle or engine owners.

(4) A description of the proper maintenance or use, if any, upon which the manufacturer conditions eligibility for repair under the remedial plan, an explanation of the manufacturer's reasons for imposing any such condition, and a description of the proof to be required of a vehicle or engine owner to demonstrate compliance with any such condition. Eligibility may not be denied solely on the basis that the vehicle or engine owner used parts not manufactured by the original equipment vehicle manufacturer, or had repairs performed by outlets other than the vehicle manufacturer's franchised dealers. No maintenance or use condition may be imposed unless it is, in the judgement of the Administrator, demonstrably related to preventing the nonconformity.

(5) A description of the procedure to be followed by vehicle or engine owners to obtain correction of the nonconformity. This shall include designation of the date on or after which the owner can have the nonconformity remedied, the time reasonably necessary to perform the labor required to correct the nonconformity, and the designation of facilities at which the nonconformity can be remedied: *Provided,* That repair shall be completed within a reasonable time designated by the Administrator from the date the owner first tenders his vehicle or engine after the date designated by the manufacturer as the date on or after which the owner can have the nonconformity remedied.

(6) If some or all of the nonconforming vehicles or engines are to be remedied by persons other than dealers or authorized warranty agents of the manufacturer, a description of the class of persons other than dealers and authorized warranty agents of the manufacturer who will remedy the nonconformity, and a statement indicating that the participating memoers of the class will be properly equipped to perform such remedial action.

(7) Three copies of the letters of notification to be sent to vehicle or engine owners.

(8) A description of the system by which the manufacturer will assure that an adequate supply of parts will be available to perform the repair under the remedial plan including the date by which an adequate supply of parts will be available to initiate the repair campaign, the percentage of the total parts requirement of each person who is to perform the repair under the remedial plan to be shipped to initiate the campaign, and the method to be used to assure the supply remains both adequate and responsive to owner demand.

(9) Three copies of all necessary instructions to be sent to those persons who are to perform the repair under the remedial plan.

(10) A description of the impact of the proposed changes on fuel consumption, driveability, and safety of each class or category of vehicles or engines to be recalled and a brief summary of the data, technical studies, or engineering evaluations which support these conclusions.

(11) Any other information, reports or data which the Administrator may reasonably determine is necessary to evaluate the remedial plan.

(b)(1) Notification to vehicle or engine owners shall be made by first class mail or by such means as approved by the Administrator: *Provided,* That for good cause, the Administrator may require the use of certified mail to ensure an effective notification.

(2) The manufacture shall use all reasonable means necessary to locate vehicle or engine owners: *Provided,* That for good cause, the Administrator may require the manufacturer to use motor vehicle registration lists as available from State or commercial sources to obtain the names and addresses of vehicle or engine owners to ensure an effective notification.

(3) The Administrator reserves the right to require the manufacturer to send by first class mail or other reasonable means subsequent notification to vehicle or engine owners: *Provided,* That for good cause, the Administrator may require the use of certified mail to ensure an effectctive notification.

(c)(1) The manufacturer shall require those who perform the repair under the remedial plan to affix a label to each vehicle or engine repaired or, when required, inspected under the remedial plan.

(2) The label shall be placed in such location as approved by the Administrator consistent with State law and shall be fabricated of a material suitable for the location in which it is installed and which is not readily removable intact.

(3) The label shall contain

(i) The recall campaign number; and

(ii) A code designating the campaign facility at which the repair, or inspection for repair was performed.

(4) The Administrator reserves the right to waive any or all of the requirements of this paragraph if he determines that they constitute an unwarranted burden to the manufacturer.

(d) The Administrator may require the manufacturer to conduct tests on components and vehicles or engines incorporating a proposed change, repair, or modification reasonably designed and necessary to demonstrate the effectiveness of the change, repair, or modification.

NOTE: An interpretive ruling regarding § 85.1803 is published in Appendix A to this subpart.

[39 FR 44375, Dec. 23, 1974, as amended at 40 FR 28067, July 3, 1975; 42 FR 36456, July 15, 1977; 45 FR 36398, May 30, 1980]

§ 85.1804 Approval of Plan: Implementation.

(a) If the Administrator finds that the remedial plan is designed and effective to correct the nonconformity, he will so notify the manufacturer in writing. If the remedial plan is not approved, the Administrator will provide the manufacturer notice of the disapproval and the reasons for the disapproval in writing.

(b) Upon receipt of notice from the Administrator that the remedial plan has been approved, the manufacturer shall commence implementation of the approved plan. Notification of vehicle or engine owners shall be in accordance with requirements of this subpart and shall proceed as follows:

(1) When no public hearing as described in § 85.1807 is requested by the manufacturer, notification of vehicles or engine owners shall commence within 15 working days of the receipt by the manufacturer of the Administrator's approval unless otherwise specified by the Administrator.

(2) When a public hearing as described in § 85.1807 is held, unless as a result of such hearing the Administrator withdraws the determination of nonconformity, the Administrator shall, within 60 days after the completion of such hearing, order the manufacturer to provide prompt notification of such nonconformity.

§ 85.1805 Notification to vehicle or engine owners.

(a) The notification of vehicle or engine owners shall contain the following:

(1) The statement: "The Administrator of the U.S. Environmental Protection Agency has determined that your vehicle or engine may be emitting pollutants in excess of the Federal emission standards. These standards were established to protect the public health or welfare from the dangers of air pollution."

(2) A statement that the nonconformity of any such vehicles or engines which have been, if required by the remedial plan, properly maintained and used, will be remedied at the expense of the manufacturer.

(3) A description of the proper maintenance or use, if any, upon which the manufacturer conditions eligibility for repair under the remedial plan and a description of the proof to be required of a vehicle or engine owner to demonstrate compliance with such condition. Eligibility may not be denied solely on the basis that the vehicle or engine owner used parts not manufactured by the original equipment vehicle manufacturer, or had repairs performed by outlets other than the vehicle manufacturer's franchised dealers.

(4) A clear description of the components which will be affected by the remedy and a general statement of the measures to be taken to correct the nonconformity.

(5) A statement that such nonconformity if not repaired may cause the vehicle or engine to fail an emission inspection test when such tests are required under State or local law.

(6) A description of the adverse affects, if any, that an uncorrected nonconformity would have on the performance or driveability of the vehicle or engine.

(7) A description of the adverse affects, if any, that such nonconformity would have on the functions of other engine components.

(8) A description of the procedure which the vehicle or engine owner should follow to obtain correction of the nonconformity. This shall include designation of the date on or after which the owner can have the nonconformity remedied, the time reasonably necessary to perform the labor required to correct the nonconformity, and the designation of facilities at which the nonconformity can be remedied.

(9) A card to be used by a vehicle or engine owner in the event the vehicle or engine to be recalled has been sold. Such card should be addressed to the manufacturer and shall provide a space in which the owner may indicate the name and address of the person to whom the vehicle or engine was sold.

(10) The statement: "In order to ensure your full protection under the emission warranty made applicable to your (vehicle or engine) by Federal law, and your right to participate in future recalls, it is recommended that you have (vehicle or engine) serviced as soon as possible. Failure to do so could legally be determined to be a lack of proper maintenance of your (vehicle or engine)."

(b) No notice sent pursuant to paragraph (a) of this section nor any other contemporaneous communication sent to vehicle or engine owners or dealers shall contain any statement or implication that the nonconformity does not exist or that the nonconformity will not degrade air quality.

(c) The manufacturer shall be informed of any other requirements pertaining to the notification under this section which the Administrator has determined are reasonable and necessary to ensure the effectiveness of the recall campaign.

§ 85.1806 Records and reports.

(a) The manufacturer shall provide to the Administrator a copy of all communications which relate to the remedial plan directed to dealers and other persons who are to perform the repair under the remedial plan. Such copies shall be mailed to the Administrator contemporaneously with their transmission to dealers and other persons who are to perform the repair under the remedial plan.

(b) The manufacturer shall provide for the establishment and maintenance of records to enable the Administrator to conduct a continuing analysis of the adequacy of the recall campaign. The records shall include, for each class or category of vehicle or engine, but need not be limited to, the following:

(1) Recall campaign number as designated by the manufacturer.

(2) Date owner notification was begun, and date completed.

(3) Number of vehicles or engines involved in the recall campaign.

(4) Number of vehicles or engines known or estimated to be affected by the nonconformity.

(5) Number of vehicles or engines inspected pursuant to the remedial plan.

(6) Number of inspected vehicles found to be affected by the nonconformity.

(7) Number of vehicles actually receiving repair under the remedial plan.

(8) Number of vehicles determined to be unavailable for inspection or repair under the remedial plan due to exportation, theft, scrapping or for other reasons (specify).

(9) Number of vehicles or engines determined to be ineligible for remedial action due to a failure to properly maintain or use such vehicles or engines.

(c) If the manufacturer determines that the original answers for paragraphs (b) (3) and (4) of this section are incorrect, revised figures and an explanatory note shall be submitted. Answers to paragraphs (b) (5), (6), (7), and (8), and (9) of this section shall be cumulative totals.

(d) Unless otherwise directed by the Administrator, the information specified in paragraph (b) of this section shall be included in quarterly reports, with respect to each recall campaign, for six consecutive quarters beginning with the quarter in which the notification of owners was initiated, or until all nonconforming vehicles or engines involved in the campaign have been remedied, whichever occurs sooner. Such reports shall be submitted no later than 25 working days after the close of each calendar quarter.

(e) The manufacturer shall maintain in a form suitable for inspection, such as computer information storage devices or card files, lists of the names and addresses of vehicles or engine owners.

(1) To whom notification was given;

(2) Who received remedial repair or inspection under the remedial plan; and

(3) When eligibility for repair is conditioned on proper maintenance or use, that were determined not to qualify for such remedial action.

(f) The records described in paragraph (e) of this section shall be made available to the Administrator upon request.

(g) The records and reports required by this section shall be retained for not less than 5 years.

[39 FR 44375, Dec. 23, 1974; 40 FR 3447, Jan. 22, 1975]

§ 85.1807 Public hearings.

(a) *Definitions.* The following definitions shall be applicable to this section:

(1) "Hearing Clerk" shall mean the Hearing Clerk of the Environmental Protection Agency.

(2) "Intervener" shall mean a person who files a petition to be made an intervener pursuant to paragraph (g) of this section and whose petition is approved.

(3) "Manufacturer" refers to a manufacturer contesting a recall order directed at that manufacturer.

(4) "Party" shall include the Environmental Protection Agency, the manufacturer, and any interveners.

(5) "Presiding Officer" shall mean an Administrative Law Judge appointed pursuant to 5 U.S.C. 3105 (see also 5 CFR Part 930 as amended).

(6) "Judicial Officer" shall mean an officer or employee of the Agency appointed as a Judicial Officer by the Administrator pursuant to this section who shall meet the qualifications and perform functions as follows:

(i) *Officer.* There may be designated for the purposes of this section one or more Judicial Officers. As work requires, there may be a Judicial Officer designated to act for the purposes of a particular case.

(ii) *Qualifications.* A Judicial Officer may be a permanent or temporary employee of the Agency who performs other duties for the Agency. Such Judicial Officer shall not be employed by the Office of Enforcement and General Counsel or the Office of Mobile Source and Noise Enforcement or have any connection with the preparation or presentation of evidence for a hearing held pursuant to this subpart.

(iii) *Functions.* The Administrator may consult with a Judicial Officer or delegate all or part of his authority to act in a given case under this section to a Judicial Officer: *Provided,* That this delegation shall not preclude the Judicial Officer from referring any motion or case to the Administrator when the Judicial Officer determines such referral to be appropriate.

(b) *Request for public hearing.* (1)(i) If the manufacturer disagrees with the Administrator's finding of nonconformity he may request a public hearing as described in this section. Requests for such a hearing shall be filed with the Administrator not later than 45 days after the receipt of the Administrator's notification of nonconformity unless otherwise specified by the Administrator. Two copies of such request shall simultaneously be served upon the Director of the Manufacturers Operations Division and two copies filed with the Hearing Clerk. Failure of the manufacturer to request a hearing within the time provided shall constitute a waiver of his right to such a hearing. In such a case, the manufacturer shall carry out the recall order as required by § 85.1803-6. (ii) Subsequent to the expiration of the period for requesting a hearing as of right, the Administrator may, in his discre-

tion and for good cause shown, grant the manufacturer a hearing to contest the nonconformity.

(2) The request for a public hearing shall contain:

(i) A statement as to which classes or categories of vehicles or engines are to be the subject of the hearing;

(ii) A concise statement of the issues to be raised by the manufacturer at the hearing for each class or category of engine or vehicle for which the manufacturer has requested the hearing; and

(iii) A statement as to reasons the manufacturer believes he will prevail on the merits on each of the issues so raised.

(3) A copy of all requests for public hearings shall be kept on file in the Office of the Hearing Clerk and shall be made available to the public during Agency business hours.

(c) *Filing and service.* (1) An original and two copies of all documents or papers required or permitted to be filed pursuant to this section shall be filed with the Hearing Clerk. Filing shall be deemed timely if mailed, as determined by the postmark, to the Hearing Clerk within the time allowed by this section. If filing is to be accomplished by mailing, the documents shall be sent to the address set forth in the notice of public hearing as described in paragraph (f) of this section.

(2) Except for requests to commence a hearing, at the same time a party files with the Hearing Clerk any additional issues for consideration at the hearing or any written testimony, documents, papers, exhibits, or materials, proposed to be introduced into evidence or papers filed in connection with any appeal, it shall serve upon all other parties copies thereof. A certificate of service shall be provided on or accompany each document or paper filed with the Hearing Clerk. Documents to be served upon the Director of the Manufacturers Operations Division shall be mailed to: Director, Manufacturers Operations Division, U.S. Environmental Protection Agency (EG-340), 401 M Street SW, WSM, Washington, D.C. 20460. Service by mail is complete upon mailing.

(d) *Time.* (1) In computing any period of time prescribed or allowed by this section, except as otherwise provided, the day of the act or event from which the designated period of time begins to run shall not be included. Saturdays, Sundays, and Federal legal holidays shall be included in computing any such period allowed for the filing of any document or paper, except that when such period expires on a Saturday, Sunday, or Federal legal holiday, such period shall be extended to include the next following business day.

(2) A prescribed period of time within which a party is required or permitted to do an act shall be computed from the time of service, except that when service is accomplished by mail, three days shall be added to the prescribed period.

(e) *Consolidation.* The Administrator or the Presiding Officer in his discretion may consolidate two or more proceedings to be held under this section for the purpose of resolving one or more issues whenever it appears that such consolidation will expedite or simplify consideration of such issues. Consolidation shall not affect the right of any party to raise issues that could have been raised if consolidation had not occurred.

(f) *Notice of public hearings.* (1) Notice of a public hearing under this section shall be given by publication in the FEDERAL REGISTER. Notice will be given at least 30 days prior to the commencement of such hearings.

(2) The notice of a public hearing shall include the following information:

(i) The purpose of the hearing and the legal authority under which the hearing is to be held;

(ii) A brief summary of the Administrator's determination of nonconformity;

(iii) A brief summary of the manufacturer's basis for contesting the Administrator's determination of nonconformity;

(iv) Information regarding the time and location of the hearing and the address to which all documents required or permitted to be filed should be sent;

(v) The address of the Hearing Clerk to whom all inquiries should be directed and with whom documents are required to be filed;

(vi) A statement that all petitions to be made an intervener must be filed with the Hearing Clerk within 25 days from the date of the notice of public hearing and must conform to the requirements of paragraph (g) of this section.

(3) The notice of public hearing shall be issued by the Assistant Administrator for Enforcement and General Counsel.

(g) *Interveners.* (1) Any person desiring to intervene in a hearing to be held under section 207(c)(1) of the Act shall file a petition setting forth the facts and reasons why he thinks he should be permitted to intervene.

(2) In passing upon a petition to intervene, the following factors, among other things, shall be considered by the Presiding Officer:

(i) The nature of the petitioner's interest including the nature and the extent of the property, financial, environmental protection, or other interest of the petitioner;

(ii) The effect of the order which may be entered in the proceeding on petitioner's interest;

(iii) The extent to which the petitioner's interest will be represented by existing parties or may be protected by other means;

(iv) The extent to which petitioner's participation may reasonably be expected to assist materially in the development of a complete record;

(v) The effect of the intervention on the Agency's statutory mandate.

(3) A petition to intervene must be filed within 25 days following the notice of public hearing under section 207(c) (1) of the Act and shall be served on all parties. Any opposition to such petition must be filed within five days of such service.

(4) All petitions to be made an intervener shall be reviewed by the Presiding Officer using the criteria set forth in paragraph (g)(2) of this section and considering any oppositions to such petition. Where the petition demonstrates that the petitioner's interest is limited to particular issues, the Presiding Officer may, in granting such petition, limit petitioner's participation to those particular issues only.

(5) If the Presiding Officer grants the petition with respect to any or all issues, he shall so notify, or direct the Hearing Clerk to notify, the petitioner and all parties. If the Presiding Officer denies the petition he shall so notify, or direct the Hearing Clerk to notify, the petitioner and all parties and shall briefly state the reasons why the petition was denied.

(6) All petitions to be made an intervener shall include an agreement by the petitioner, and any person represented by the petitioner, to be subject to examination and cross-examination and to make any supporting and relevant records available at its own expense upon the request of the Presiding Officer, on his own motion or the motion of any party or other intervener. If the intervener fails to comply with any such request, the Presiding Officer may in his discretion, terminate his status as an intervener.

(h) *Intervention by motion.* Following the expiration of the time prescribed in paragraph (g) of this section for the submission of petitions to intervene in a hearing, any person may file a motion with the Presiding Officer to intervene in a hearing. Such a motion must contain the information and commitments required by paragraph (g) (2) and (6) of this section, and, in addition, must show that there is good cause for granting the motion and must contain a statement that the intervener shall be bound by agreements, arrangements, and other determinations which may have been made in the proceeding.

(i) *Amicus Curiae.* Persons not parties to the proceedings wishing to file briefs may do so by leave of the Presiding Officer granted on motion. A motion for leave shall identify the interest of the applicant and shall state the reasons why the proposed amicus brief is desirable.

(j) *Presiding Officer.* The Presiding Officer shall have the duty to conduct a fair and impartial hearing in accordance with 5 U.S.C. sections 554, 556 and 557, to take all necessary action to avoid delay in the disposition of the proceedings and to maintain order. He shall have all power consistent with

Agency rule and with the Administrative Procedure Act necessary to this end, including the following:

(1) To administer oaths and affirmations;

(2) To rule upon offers of proof and receive relevant evidence;

(3) To regulate the course of the hearings and the conduct of the parties and their counsel therein;

(4) To hold conferences for simplification of the issues or any other proper purpose;

(5) To consider and rule upon all procedural and other motions appropriate in such proceedings;

(6) To require the submission of direct testimony in written form with or without affidavit whenever, in the opinion of the Presiding Officer, oral testimony is not necessary for full and true disclosure of the facts. Testimony concerning the conduct and results of tests and inspections may be submitted in written form.

(7) To enforce agreements and orders requiring access as authorized by law;

(8) To require the filing of briefs on any matter on which he is required to rule;

(9) To require any party or any witness, during the course of the hearing, to state his position on any issue;

(10) To take or cause depositions to be taken whenever the ends of justice would be served thereby;

(11) To make decisions or recommend decisions to resolve the disputed issues of the record of the hearing.

(12) To issue, upon good cause shown, protective orders as described in paragraph (n) of this section.

(k) *Conferences.* (1) At the discretion of the Presiding Officer, conferences may be held prior to or during any hearing. The Presiding Officer shall direct the Hearing Clerk to notify all parties and interveners of the time and location of any such conference. At the discretion of the Presiding Officer, persons other than parties may attend. At a conference the Presiding Officer may:

(i) Obtain stipulations and admissions, receive requests and order depositions to be taken, identify disputed issues of fact and law, and require or allow the submission of written testimony from any witness or party;

(ii) Set a hearing schedule for as many of the following as are deemed necessary by the Presiding Officer:

(A) Oral and written statements;

(B) Submission of written direct testimony as required or authorized by the Presiding Officer;

(C) Oral direct and cross-examination of a witness where necessary as prescribed in paragraph (p) of this section;

(D) Oral argument, if appropriate.

(iii) Identify matters of which official notice may be taken;

(iv) Consider limitation of the number of expert and other witnesses;

(v) Consider the procedure to be followed at the hearing; and

(vi) Consider any other matter that may expedite the hearing or aid in the disposition of the issue.

(2) The results of any conference including all stipulations shall, if not transcribed, be summarized in writing by the Presiding Officer and made part of the record.

(l) *Primary discovery (exchange of witness lists and documents).* (1) At a prehearing conference or within some reasonable time set by the Presiding Officer prior to the hearing, each party shall make available to the other parties the names of the expert and other witnesses the party expects to call, together with a brief summary of their expected testimony and a list of all documents and exhibits which the party expects to introduce into evidence. Thereafter, witnesses, documents, or exhibits may be added and summaries of expected testimony amended upon motion by a party.

(2) The Presiding Officer, may, upon motion by a party or other person, and for good cause shown, by order (i) restrict or defer disclosure by a party of the name of a witness or a narrative summary of the expected testimony of a witness, and (ii) prescribe other appropriate measures to protect a witness. Any party affected by any such action shall have an adequate opportunity, once he learns the name of a witness and obtains the narrative summary of his expected testimony, to prepare for the presentation of his case.

(m) *Other discovery.* (1) Except as so provided by paragraph (l) of this section, further discovery, under this paragraph, shall be permitted only upon determination by the Presiding Officer:

(i) That such discovery will not in any way unreasonably delay the proceeding;

(ii) That the information to be obtained is not obtainable voluntarily; and

(iii) That such information has significant probative value. The Presiding Officer shall be guided by the procedures set forth in the Federal Rules of Civil Procedure, where practicable, and the precedents thereunder, except that no discovery shall be undertaken except upon order of the Presiding Officer or upon agreement of the parties.

(2) The Presiding Officer shall order depositions upon oral questions only upon a showing of good cause and upon a finding that:

(i) The information sought cannot be obtained by alternative methods; or

(ii) There is a substantial reason to believe that relevant and probative evidence may otherwise not be preserved for presentation by a witness at the hearing.

(3) Any party to the proceeding desiring an order of discovery shall make a motion or motions therefor. Such a motion shall set forth:

(i) The circumstances warranting the taking of the discovery;

(ii) The nature of the information expected to be discovered; and

(iii) The proposed time and place where it will be taken. If the Presiding Officer determines the motion should be granted, he shall issue an order for the taking of such discovery together with the conditions and terms thereof.

(4) Failure to comply with an order issued pursuant to this paragraph may lead to the inference that the information to be discovered would be adverse to the person or party from whom the information was sought.

(n) *Protective orders: in camera proceedings.* (1) Upon motion by a party or by the person from whom discovery is sought, and upon a showing by the movant that the disclosure of the information to be discovered, or a particular part thereof, (other than emission data) would result in methods or processes entitled to protection as trade secrets of such person being divulged, the Presiding Officer may enter a protective order with respect to such material. Any protective order shall contain such terms governing the treatment of the information as may be appropriate under the circumstances to prevent disclosure outside the hearing: *Provided,* That the order shall state that the material shall be filed separately from other evidence and exhibits in the hearing. Disclosure shall be limited to parties to the hearing, their counsel and relevant technical consultants, and authorized representatives of the United States concerned with carrying out the Act. Except in the case of the government, disclosure may be limited to counsel to parties who shall not disclose such information to the parties themselves. Except in the case of the government, disclosure to a party or his counsel shall be conditioned on execution of a sworn statement that no disclosure of the information will be made to persons not entitled to receive it under the terms of the protective order. (No such provision is necessary where government employees are concerned because disclosure by them is subject to the terms of 18 U.S.C. 1905.)

(2)(i) A party or person seeking a protective order may be permitted to make all or part of the required showing in camera. A record shall be made of such in camera proceedings. If the Presiding Officer enters a protective order following a showing in camera, the record of such showing shall be sealed and preserved and made available to the Agency or court in the event of appeal.

(ii) Attendance at any in camera proceeding may be limited to the Presiding Officer, the Agency, and the person or party seeking the protective order.

(3) Any party, subject to the terms and conditions of any protective order issued pursuant to subparagraph (1) of this paragraph, desiring for the presentation of his case to make use of any in camera documents or testimony shall make application to the Presiding Officer by motion setting forth the justification therefor. The Presiding

Officer, in granting any such motion, shall enter an order protecting the rights of the affected persons and parties and preventing unnecessary disclosure of such information, including the presentation of such information and oral testimony and cross-examination concerning it in executive session, as in his discretion is necessary and practicable.

(4) In the submittal of proposed findings, briefs, or other papers, counsel for all parties shall make a good faith attempt to refrain from disclosing the specific details of *in camera* documents and testimony. This shall not preclude references in such proposed findings, briefs, or other papers to such documents or testimony including generalized statements based on their contents. To the extent that counsel consider it necessary to include specific details in their presentations, such data shall be incorporated in separate proposed findings, briefs, or other papers marked "confidential", which shall become part of the *in camera* record.

(o) *Motions.* (1) All motions, except those made orally during the course of the hearing, shall be in writing and shall state with particularity the grounds therefor, shall set forth the relief or order sought, and shall be filed with the Hearing Clerk and served upon all parties.

(2) Within ten days after service of any motion filed pursuant to this section, or within such other time as may be fixed by the Administrator, the Judicial Officer, or the Presiding Officer, as appropriate, any party may serve and file an answer to the motion. The movant shall, if requested by the Administrator, the Judicial Officer, or the Presiding Officer, as appropriate, serve and file reply papers within the time set by the request.

(3) The Presiding Officer shall rule upon all motions filed or made prior to the filing of his decision or accelerated decision, as appropriate. The Administrator or the Judicial Officer, as appropriate, shall rule upon all motions filed prior to the appointment of a Presiding Officer and all motions filed after the filing of the decision of the Presiding Officer or accelerated decision. Oral argument of motions will be permitted only if the Presiding Officer, the Administrator, or the Judicial Officer, as appropriate, deems it necessary.

(p) *Evidence.* (1) The official transcripts and exhibits, together with all papers and requests filed in the proceeding, shall constitute the record. Immaterial or irrelevant parts of an admissible document shall be segregated and excluded so far as practicable. Documents or parts thereof subject to a protective order under paragraph (n) of this section shall be segregated. Evidence may be received at the hearing even though inadmissible under the rules of evidence applicable to judicial proceedings. The weight to be given evidence shall be determined by its reliability and probative value.

(2) The Presiding Officer shall allow the parties to examine and to cross-examine a witness to the extent that such examination and cross-examination is necessary for a full and true disclosure of the facts.

(3) Rulings of the Presiding Officer on the admissibility of evidence, the propriety of examination and cross-examination and other procedural matters shall appear in the record.

(4) Parties shall automatically be presumed to have taken exception to an adverse ruling.

(q) *Interlocutory Appeal.* (1) An interlocutory appeal may be taken to the Administrator either (i) with the consent of the Presiding Officer and where he certifies on the record or in writing that the allowance of an interlocutory appeal is clearly necessary to prevent exceptional delay, expense or prejudice to any party or substantial detriment to the public interest, or (ii) absent the consent of the Presiding Officer, by permission of the Administrator.

(2) Applications for interlocutory appeal of any ruling or order of the Presiding Officer may be filed with the Presiding Officer within 5 days of the issuance of the ruling or order being appealed. Answers thereto by other parties may be filed within 5 days of the service of such applications.

(3) The Presiding Officer shall rule on such applications within 5 days of

the filing of such application or answers thereto.

(4) Applications to file such appeals absent consent of the Presiding Officer shall be filed with the Administrator within 5 days of the denial of any appeal by the Presiding Officer.

(5) The Administrator will consider the merits of the appeal on the application and any answers thereto. No oral argument will be heard nor other briefs filed unless the Administrator directs otherwise.

(6) Except under extraordinary circumstances as determined by the Presiding Officer, the taking of an interlocutory appeal will not stay the hearing.

(r) *Record.* (1) Hearings shall be stenographically reported and transcribed, and the original transcript shall be part of the record and the sole official transcript. Copies of the record shall be filed with the Hearing Clerk and made available during Agency business hours for public inspection. Any person desiring a copy of the record of the hearing or any part thereof shall be entitled to the same upon payment of the cost thereof.

(2) The official transcripts and exhibits, together with all papers and requests filed in the proceeding, shall constitute the record.

(s) *Proposed findings, conclusions.* (1) Within 20 days of the close of the reception of evidence, or within such longer time as may be fixed by the Presiding Officer, any party may submit for the consideration of the Presiding Officer proposed findings of fact, conclusions of law, and a proposed rule or order, together with reasons therefor and briefs in support thereof. Such proposals shall be in writing, shall be served upon all parties, and shall contain adequate references to the record and authorities relied on.

(2) The record shall show the Presiding Officer's ruling on the proposed findings and conclusions except when his order disposing of the proceeding otherwise informs the parties of the action taken by him thereon.

(t) *Decision of the Presiding Officer.* (1) Unless extended by the Administrator, the Presiding Officer shall issue and file with the Hearing Clerk his decision within 30 days after the period for filing proposed findings as provided for in paragraph(s) of this section has expired.

(2) The Presiding Officer's decision shall become the decision of the Administrator (i) when no notice of intention to appeal as described in paragraph (u) of this section is filed, 30 days after the issuance thereof, unless in the interim the Administrator shall have taken action to review or stay the effective date of the decision; or (ii), when a notice of intention to appeal is filed but the appeal is not perfected as required by paragraph (u) of this section, 5 days after the period allowed for perfection of an appeal has expired unless within that 5 day period, the Administrator shall have taken action to review or stay the effective date of the decision.

(3) The Presiding Officer's decision shall include a statement of findings and conclusions, as well as the reasons or basis therefor, upon all the material issues of fact or law presented on the record and an appropriate rule or order. Such decision shall be supported by substantial evidence and based upon a consideration of the whole record.

(4) At any time prior to the issuance of his decision, the Presiding Officer may reopen the proceeding for the reception of further evidence. Except for the correction of clerical errors, the jurisdiction of the Presiding Officer is terminated upon the issuance of his decision.

(u) *Appeal from the Decision of the Presiding Officer.* (1) Any party to a proceeding may appeal the Presiding Officer's decision to the Administrator: *Provided,* That within 10 days after issuance of the Presiding Officer's decision such party files a notice of intention to appeal and an appeal brief within 30 days of such decision.

(2) When an appeal is taken from the decision of the Presiding Officer, any party may file a brief with respect to such appeal. The brief shall be filed within 20 days of the date of the filing of the appellant's brief.

(3) Any brief filed pursuant to this paragraph shall contain in the order indicated, the following:

(i) A subject index of the matter in the brief, with page references, and a table of cases (alphabetically arranged), textbooks, statutes, and other material cited, with page references thereto;

(ii) A specification of the issues intended to be urged;

(iii) The argument presenting clearly the points of fact and law relied upon in support of the position taken on each issue, with specific page references to the record and the legal or other material relied upon; and

(iv) A proposed form of rule or order for the Administrator's consideration if different from the rule or order contained in the Presiding Officer's decision.

(4) No brief in excess of 40 pages shall be filed without leave of the Administrator.

(5) Oral argument will be allowed in the discretion of the Administrator.

(v) *Review of the Presiding Officer's Decision in Absence of Appeal.* (1) If, after the expiration of the period for taking an appeal as provided for by paragraph (u) of this section, no notice of intention to appeal the decision of the Presiding Officer has been filed, or if filed, not perfected, the Hearing Clerk shall so notify the Administrator.

(2) The Administrator, upon receipt of notice from the Hearing Clerk that no notice of intention to appeal has been filed, or if filed, not perfected pursuant to paragraph (u) of this section, may, on his own motion, within the time limits specified in paragraph (t)(2) of this section, review the decision of the Presiding Officer. Notice of the intention of the Administrator to review the decision of the Presiding Officer shall be given to all parties and shall set forth the scope of such review and the issues which shall be considered and shall make provision for filing of briefs.

(w) *Decision on appeal or review.* (1) Upon appeal from or review of the Presiding Officer's decision, the Administrator shall consider such parts of the record as are cited or as may be necessary to resolve the issues presented and, in addition shall to the extent necessary or desirable exercise all the powers which he could have exercised if he had presided at the hearing.

(2) In rendering his decision, the Administrator shall adopt, modify or set aside the findings, conclusions, and rule or order contained in the decision of the Presiding Officer and shall set forth in his decision a statement of the reasons or bases for his action.

(3) In those cases where the Administrator believes that he should have further information or additional views of the parties as to the form and content of the rule or order to be issued, the Administrator, in his discretion, may withhold final action pending the receipt of such additional information or views, or may remand the case to the Presiding Officer.

(x) *Reconsideration.* Within twenty (20) days after issuance of the Administrator's decision, any party may file with the Administrator a petition for reconsideration of such decision, setting forth the relief desired and the grounds in support thereof. Any petition filed under this subsection must be confined to new questions raised by the decision or final order and upon which the petitioner had no opportunity to argue before the Presiding Officer or the Administrator. Any party desiring to oppose such a petition shall file and answer thereto within ten (10) days after the filing of the petition. The filing of a petition for reconsideration shall not operate to stay the effective date of the decision or order or to toll the running of any statutory time period affecting such decision or order unless specifically so ordered by the Administrator.

(y) *Accelerated decision: Dismissal.* (1) The Presiding Officer, upon motion of any party or *sua sponte*, may at any time render an accelerated decision in favor of the Agency or the manufacturer as to all or any part of the proceeding, without further hearing or upon such limited additional evidence such as affidavits as he may require, or dismiss any party with prejudice, under any of the following conditions:

(i) Failure to state a claim upon which relief can be granted, or direct or collateral estoppel;

(ii) There is no genuine issue of material fact and a party is entitled to judgment as a matter of law; or

(iii) Such other and further reasons as are just, including specifically failure to obey a procedural order of the Presiding Officer.

(2) If under this paragraph an accelerated decision is issued as to all the issues and claims joined in the proceeding, the decision shall be treated for the purposes of these procedures as the decision of the Presiding Officer as provided in paragraph (p) of this section.

(3) If under this paragraph, judgment is rendered on less than all issues or claims in the proceeding, the Presiding Officer shall determine what material facts exist without substantial controversy and what material facts are actually and in good faith controverted. He shall thereupon issue an order specifying the facts which appear without substantial controversy, and the issues and claims upon which the hearing will proceed.

(z) *Conclusion of hearing.* (1) If, after the expiration of the period for taking an appeal as provided for by paragraph (u) of this section, no appeal has been taken from the Presiding Officer's decision, and, after the expiration of the period for review by the Administrator on his own motion as provided for by paragraph (v) of this section, the Administrator does not move to review such decision, the hearing will be deemed to have ended at the expiration of all periods allowed for such appeal and review.

(2) If an appeal of Presiding Officer's decision is taken pursuant to paragraph (u) of this section, or if, in the absence of such appeal, the Administrator moves to review the decision of the Presiding Officer pursuant to paragraph (v) of this section, the hearing will be deemed to have ended upon the rendering of a final decision by the Administrator.

(aa) *Judicial Review.* (1) The Administrator hereby designates the Deputy General Counsel, Environmental Protection Agency as the officer upon whom copy of any petition for judicial review shall be served. Such officer shall be responsible for filing in the court the record on which the order of the Administrator is based.

(2) Before forwarding the record to the court, the Agency shall advise the petitioner of costs of preparing it and as soon as payment to cover fees is made shall forward the record to the court.

[39 FR 44375, Dec. 23, 1974; 40 FR 3447, Jan. 22, 1975, as amended at 44 FR 61962, Oct. 29, 1979]

Appendix A to Subpart S—Interpretive Ruling for § 85.1803—Remedial Plans

The purpose of this rule is to set forth EPA's interpretation regarding one aspect of a motor vehicle or motor vehicle engine manufacturer's recall liability under section 207(c)(1) of the Clean Air Act, 42 U.S.C. 7641(c)(1). This rule will provide guidance to vehicle and engine manufacturers to better enable them to submit acceptable remedial plans.

Section 207(c)(1) requires the Administrator to base a recall order on a determination that a substantial number of in-use vehicles or engines within a given class or category of vehicles or engines, although properly maintained and used, fail to conform to the regulations prescribed under section 202 when in actual use throughout their useful lives. After making such a determination, he shall require the manufacturer to submit a plan to remedy the nonconformity of any such vehicles or engines. The plan shall provide that the manufacturer will remedy, at the manufacturer's expense, all properly maintained and used vehicles which experienced the nonconformity during their useful lives regardless of their age or mileage at the time of repair.

(Secs. 207 and 301(a) of the Clean Air Act, as amended, 42 U.S.C. 7541 and 7601(a))

[45 FR 36398, May 30, 1980]

Subpart T—Emission Defect Reporting Requirements

Authority: Sections 208(a) and 301(a) of the Clean Air Act, as amended (42 U.S.C. 1857f-6(a) and 1857g(a)).

Source: 42 FR 28128, June 2, 1977, unless otherwise noted.

§ 85.1901 Applicability.

The requirements of this subpart shall be applicable to all 1972 and

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later model year vehicles and engines. The requirement to report emission-related defects affecting a given class or category of vehicles or engines shall remain applicable for five years from the end of the model year in which such vehicles or engines were manufactured.

§ 85.1902 Definitions.

For the purposes of this subpart and unless otherwise noted:

(a) "Act" shall mean the Clean Air Act, 42 U.S.C. 1857, as amended.

(b) The phrase "emission-related defect" shall mean a defect in design, materials, or workmanship in a device, system, or assembly described in the approved Application for Certification (required by 40 CFR 86.077-22 and like provisions of Part 85 and Part 86 of Title 40 of the Code of Federal Regulations) which affects any parameter or specification enumerated in Appendix VIII.

(c) The phrase "useful life" shall be given the meaning ascribed to it by Section 202(d) of the Act and regulations promulgated thereunder.

(d) The phrase "Voluntary Emissions Recall" shall mean a repair, adjustment, or modification program voluntarily initiated and conducted by a manufacturer to remedy any emission-related defect for which direct notification of vehicle or engine owners has been provided.

(e) The phrase "ultimate purchaser" shall be given the meaning ascribed to it by Section 214 of the Act.

(f) The term "manufacturer" shall be given the meaning ascribed to it by Section 214 of the Act.

§ 85.1903 Emissions defect information report.

(a) A manufacturer shall file a defect information report whenever, on the basis of data obtained subsequent to the effective date of these regulations:

(1) The manufacturer determines in accordance with procedures established by the manufacturer to identify safety related defects (pursuant to 15 U.S.C. 1381 et seq., as amended) that a specific emission-related defect exists; and

(2) That the specific emission-related defect exists in twenty-five or more vehicles or engines of the same model year.

No report shall be filed under this paragraph for any emission-related defect corrected prior to the sale of the affected vehicles or engines to an ultimate purchaser.

(b) Defect information reports required under paragraph (a) of this section shall be submitted not more than 15 working days after an emission-related defect is found to affect twenty-five vehicles or engines of the same model year. Items of information required by paragraph (c) of this section that are either not available within that period or are significantly revised shall oe submitted as they become available.

(c) Except as provided in paragraph (b) of this section, each defect report shall contain the following information in substantially the format outlined below:

(1) The manufacturer's corporate name.

(2) A description of the defect.

(3) A description of each class or category of vehicles or engines potentially affected by the defect including make, model, model year, and such other information as may be required to identify the vehicles or engines affected.

(4) For each class or category of vehicle or engine described in response to paragraph (c)(3) of this section, the following shall also be provided:

(i) The number of vehicles or engines known or estimated to have the defect and an explanation of the means by which this number was determined.

(ii) The address of the plant(s) at which the potentially defective vehicles or engines were produced.

(5) An evaluation of the emissions impact of the defect and a description of any driveability problems which a defective vehicle might exhibit.

(6) Available emissions data which relate to the defect.

(7) An indication of any anticipated manufacturer follow-up.

§ 85.1904 Voluntary emissions recall report; quarterly reports.

(a) When any manufacturer initiates a voluntary emissions recall campaign involving twenty-five or more vehicles or engines, the manufacturer shall submit a report describing the manufacturer's voluntary emissions recall plan as prescribed by this section within 15 working days of the date owner notification was begun. The report shall contain the following:

(1) A description of each class or category of vehicle or engine recalled including the number of vehicles to be recalled, the model year, the make, the model, and such other information as may be required to identify the vehicles or engines recalled.

(2) A description of the specific modifications, alterations, repairs, corrections, adjustments, or other changes to be made to correct the vehicles or engines affected by the emission-related defect.

(3) A description of the method by which the manufacturer will determine the names and addresses of vehicle or engine owners and the method by which they will be notified.

(4) A description of the proper maintenance or use, if any, upon which the manufacturer conditions eligibility for repair under the remedial plan, an explanation of the manufacturer's reasons for imposing any such condition, and a description of the proof to be required of a vehicle or engine owner to demonstrate compliance with any such condition.

(5) A description of the procedure to be followed by vehicle or engine owners to obtain correction of the nonconformity. This shall include designation of the date on or after which the owner can have the nonconformity remedied, the time reasonably necessary to perform the labor to remedy the defect, and the designation of facilities at which the defect can be remedied.

(6) If some or all of the nonconforming vehicles or engines are to be remedied by persons other than dealers or authorized warranty agents of the manufacturer, a description of the class of persons other than dealers and authorized warranty agents of the manufacturer who will remedy the defect.

(7) Three copies of the letters of notification to be sent to vehicle or engine owners.

(8) A description of the system by which the manufacturer will assure that an adequate supply of parts will be available to perform the repair under the remedial plan including the date by which an adequate supply of parts will be available to initiate the repair campaign, the percentage of the total parts requirement of each person who is to perform the repair under the remedial plan to be shipped to initiate the campaign, and the method to be used to assure the supply remains both adequate and responsive to owner demand.

(9) Three copies of all necessary instructions to be sent to those persons who are to perform the repair under the remedial plan.

(10) A description of the impact of the proposed changes on fuel consumption, driveability, and safety of each class or category of vehicles or engines to be recalled.

(11) A sample of any label to be applied to vehicles or engines which participate in the voluntary recall campaign.

(b) Unless otherwise specified by the Administrator, the manufacturer shall report on the progress of the recall campaign by submitting subsequent reports for six consecutive quarters commencing with the quarter after the voluntary emissions recall campaign actually begins. Such reports shall be submitted no later than 25 working days after the close of each calendar quarter. For each class or category of vehicle or engine subject to the voluntary emissions recall campaign, the quarterly report shall contain the:

(1) Emission recall campaign number, if any, designated by the manufacturer.

(2) Date owner notification was begun, and date completed.

(3) Number of vehicles or engines involved in the voluntary emissions recall campaign.

(4) Number of vehicles or engines known or estimated to be affected by the emission-related defect and an ex-

planation of the means by which this number was determined.

(5) Number of vehicles or engines inspected pursuant to the voluntary emissions recall plan.

(6) Number of inspected vehicles found to be affected by the emission-related defect.

(7) Number of vehicles actually receiving repair under the remedial plan.

(8) Number of vehicles determined to be unavailable for inspection or repair under the remedial plan due to exportation, theft, scrapping, or for other reasons (specify).

(9) Number of vehicles or engines determined to be ineligible for remedial action due to a failure to properly maintain or use such vehicles or engines.

(10) Three copies of any service bulletins transmitted to dealers which relate to the defect to be corrected and which have not previously been reported.

(11) Three copies of all communications transmitted to vehicle or engine owners which relate to the defect to be corrected and which have not previously been submitted.

(c) If the manufacturer determines that any of the information requested in paragraph (b) of this section has changed or was incorrect, revised information and an explanatory note shall be submitted. Answers to paragraphs (b), (5), (6), (7), (8), and (9) of this section shall be cumulative totals.

(d) The manufacturer shall maintain in a form suitable for inspection, such as computer information storage devices or card files, the names and addresses of vehicles or engine owners:

(1) To whom notification was given;

(2) Who received remedial repair or inspection under the remedial plan; and

(3) Who were determined not to qualify for such remedial action when eligibility is conditioned on proper maintenance or use.

(e) The records described in paragraph (d) of this section shall be made available to the Administrator upon request.

§ 85.1905 Alternative report formats.

(a) Any manufacturer may submit a plan for making either of the reports required by § 85.1903 and § 85.1904 on computer cards, magnetic tape or other machine readable format. The proposed plan shall be accompanied by sufficient technical detail to allow a determination that data requirements of these sections will be met and that the data in such format will be usable by EPA.

(b) Upon approval by the Administrator of the proposed reporting system, the manufacturer may utilize such system until otherwise notified by the Administrator.

§ 85.1906 Report filing: Record retention.

(a) The reports required by § 85.1903 and § 85.1904 shall be sent to: Director, Manufacturers Operations Division (EN 340), Environmental Protection Agency, 401 M St. SW., Washington, D.C. 20460.

(b) The information gathered by the manufacturer to compile the reports required by § 85.1903 and § 85.1904 shall be retained for not less than five years from the date of the manufacture of the vehicles or engines and shall be made available to duly authorized officials of the EPA upon request.

[42 FR 28128, June 2, 1977, as amended at 44 FR 61962, Oct. 29, 1979]

§ 85.1907 Responsibility under other legal provisions preserved.

The filing of any report under the provisions of this subpart shall not affect a manufacturer's responsibility to file reports or applications, obtain approval, or give notice under any provision of law.

§ 85.1908 Disclaimer of production warranty applicability.

(a) The act of filing an Emission Defect Information Report pursuant to § 85.1903 is inconclusive as to the existence of a defect subject to the Production Warranty provided by Section 207 (a) of the Act.

(b) A manufacturer may include on each page of its Emission Defect Information Report a disclaimer stating that the filing of a Defect Information Report pursuant to these regulations is not conclusive as to the applicability

of the Production Warranty provided by Section 207(a) of the Act.

Subpart U—[Reserved]

Subpart V—Emissions Control System Performance Warranty Regulations and Voluntary Aftermarket Part Certification Program

AUTHORITY: Secs. 203, 207, 208, and 301(a) of the Clean Air Act, as amended (42 U.S.C. 7522, 7541, 7542, and 7601(a)).

SOURCE: 45 FR 34839, May 22, 1980, unless otherwise noted.

§ 85.2101 General applicability.

Sections 85.2101 through 85.2111 are applicable to all 1981 and later model year light-duty vehicles and light-duty trucks.

§ 85.2102 Definitions.

(a) As used in §§ 85.2101 through 85.2111 all terms not defined herein shall have the meaning given them in the Act:

(1) "Act" means Part A of Title II of the Clean Air Act, 42 U.S.C. 7421 et seq. (formerly 42 U.S.C. 1857 et seq.), as amended.

(2) "Administrator" means the Administrator of the Environmental Protection Agency or an authorized representative of the Administrator.

(3) "Certified Part" means a part certified in accordance with the aftermarket part certification regulations contained in this subpart.

(4) "Emission Performance Warranty" means that warranty given pursuant to this subpart and section 207(b) of the Act.

(5) "EPA-Approved Emission Test" or "Emission Short Test" means any test prescribed under 40 CFR 85.2201 et seq., and meeting all of the requirements thereunder.

(6) "Model Year" means the manufacturer's annual production period (as determined by the Administrator) which includes January 1 of such calendar year; however, if the manufacturer has no annual production period, the term "model year" shall mean the calendar year.

(7) "Original Equipment Part" means a part present in or on a vehicle at the time the vehicle is sold to the ultimate purchaser, except for components installed by a dealer which are not manufactured by the vehicle manufacturer or are not installed at the direction of the vehicle manufacturer.

(8) "Owner" means the original purchaser or any subsequent purchaser of a vehicle.

(9) "Owner's Manual" means the instruction booklet normally provided to the purchaser of a vehicle.

(10) "Useful Life" means that period established pursuant to section 202(d) of the Act and regulations promulgated thereunder.

(11) "Vehicle" means a light duty vehicle or a light duty truck.

(12) "Warranty Booklet" means a booklet, separate from the owner's manual, containing all warranties provided with the vehicle.

(13) "Written Instructions for Proper Maintenance and Use" means those maintenance and operation instructions specified in the owner's manual as being necessary to assure compliance of a vehicle with applicable emission standards for the useful life of the vehicle that are:

(i) In accordance with the instructions specified for performance on the manufacturer's prototype vehicle used in certification (including those specified for vehicles used under special circumstances), and

(ii) In compliance with the requirements of §§ 86.XXX-38 (as appropriate for the applicable model year vehicle/engine classification), and

(iii) In compliance with any other regulations promulgated by EPA governing maintenance and use instructions.

§ 85.2103 Emission performance warranty.

(a) The manufacturer of each vehicle to which this subpart applies shall warrant in writing that if:

(1) The vehicle is maintained and operated in accordance with the written instructions for proper maintenance and use and

(2) The vehicle fails to conform at any time during its useful life to the applicable emissions standards as judged by an EPA-approved emission test, and

(3) Such nonconformity results or will result in the vehicle owner having to bear any penalty or other sanction (including the denial of the right to use the vehicle) under local, State or Federal law, then the manufacturer shall remedy the nonconformity at no cost to the owner; *except that*, if the vehicle has been in operation for more than 24 months or 24,000 miles, the manufacturer shall be required to remedy only those nonconformities resulting from the failure of components which have been installed in or on the vehicle for the sole or primary purpose of reducing vehicle emissions and that were not in general use prior to model year 1968.

(b) The warranty period shall begin on the date the vehicle is delivered to its utlimate purchaser, or if the vehicle is first placed in service as a "demonstrator" or "company" car prior to delivery, on the date it is first placed in service.

§ 85.2104 Owners' compliance with instructions for proper maintenance and use.

(a) An emission performance warranty claim may be denied on the basis of noncompliance by a vehicle owner with the written instructions for proper maintenance and use.

(b) When determining whether an owner has complied with the written instructions for proper maintenance and use, a vehicle manufacturer may require an owner to submit evidence of compliance only with those written maintenance instructions for which the manufacturer has an objective reason for believing:

(1) Were not performed; and

(2) If not performed could be the cause of the particular vehicle's exceeding applicable emission standards.

(c) Evidence of compliance with a maintenance instruction may consist of:

(1) A maintenance log book which has been validated at the approximate time or mileage intervals specified for service by someone who regularly engages in the business of servicing automobiles for the relevant maintenance instruction(s); or

(2) A showing that the vehicle has been submitted for scheduled maintenance servicing at the approximate time or mileage intervals specified for service to someone who regularly engages in the business of servicing automobiles for the purpose of performing the relevant maintenance; or

(3) A statement by the vehicle owner that he or she performed the maintenance at the approximate time or mileage interval specified including a showing,

(i) That the owner purchased and used proper parts, and

(ii) Upon request by the vehicle manufacturer, that the owner is able to perform the maintenance properly.

(d) Except as provided in paragraph (c)(5) of this section, the time/mileage interval for scheduled maintenance services shall be the service interval specified for that part in the written instructions for proper maintenance and use.

(e) For certified parts having a maintenance or replacement interval different from that specified in the written instructions for proper maintenance and use, the time/mileage interval shall be the service interval for which the part was certified.

(f) The owner may perform maintenance or have maintenance performed more frequently then required in the maintenance instructions.

(g) Except as provided in paragraph (h) of this section, a manufacturer may deny an emission performance warranty claim on the basis of noncompliance with the written instructions for proper maintenance and use only if:

(1) An owner is not able to comply with a request by a manufacturer for evidence pursuant to paragraph (c) of this section; or

(2) Notwithstanding the evidence presented pursuant to paragraph (c) of this section, the manufacturer is able to prove that the vehicle failed an emission short test because:

(i) The vehicle was abused, or

(ii) An instruction for the proper maintenance and use was performed in a manner resulting in a component's being improperly installed or a component or related parameter's being adjusted substantially outside of the manufacturer's specifications, or

(iii) Unscheduled maintenance was performed on a vehicle which resulted in the removing or rendering inoperative of any component affecting the vehicle's emissions.

(h) In no case may a manufacturer deny an emission performance warranty claim on the basis of:

(1) Warranty work or predelivery service performed by any facility authorized by the vehicle manufacturer to perform such work or service; or

(2) Work performed in an emergency situation to rectify an unsafe condition, including an unsafe driveability condition, attributable to the manufacturer, provided the vehicle owner has taken steps to put the vehicle back in a conforming condition in a timely manner; or

(3) The use of any uncertified part or non-compliance with any written instruction for proper maintenance and use which is not relevant to the reason that the vehicle failed to comply with applicable emission standards; or

(4) Any cause attributable to the vehicle manufacturer; or

(5) The use of any fuel which is commonly available in the geographical area in which the vehicle or engine is located, unless the written instructions for proper maintenance and use specify that the use of that fuel would adversely affect the emission control devices and systems of the vehicle, and there is commonly available information for the owner to identify the proper fuel to be used.

§ 85.2105 Replacement parts.

(a) No emission performance warranty claim shall be denied on the basis of the use of a properly installed certified part in the maintenance or repair of a vehicle.

(b) Except as provided in § 85.2104(h), a vehicle manufacturer may deny an emission performance warranty claim on the basis of an uncertified replacement part used in the maintenance or repair of a vehicle if the vehicle manufacturer presents evidence that the uncertified replacement part is:

(1) Either defective in materials or workmanship, or not equivalent from an emission standpoint to the original equipment part; and

(2) The owner is unable to rebut the evidence.

(c) A part not required to be replaced at a definite interval in accordance with the written instructions for maintenance and use shall be warranted for the full term of any warranty mandated by the Act. Instructions to replace a component only if checked and found to be operating below specification shall have no bearing on warranty coverage, unless an owner did not follow such an instruction prior to the short test failure and noncompliance with that instruction caused the failure of another vehicle component relevant to the nonconformity.

§ 85.2106 Warranty claim procedures.

(a) A claim under the emission performance warranty may be raised immediately upon the failure of an EPA-approved emission test if, as a result of that failure, an owner is required to take action of any kind in order to avoid imposition of a penalty or sanction. An owner need not suffer the loss of the right to use a vehicle, be fined, incur repair expenses, or actually bear any penalty or sanction to satisfy the requirement of § 85.2103(a)(3). That requirement shall be met if a test failure sets a procedure in motion under which the owner will bear a penalty or sanction if a vehicle is not brought into conformity or repaired to some specified extent within some specified period of time.

(b) A warranty claim may be submitted by bringing a vehicle to

(1) Any repair facility authorized by the vehicle manufacturer to service that model vehicle, or

(2) Any repair facility authorized by the vehicle manufacturer to perform emission performance warranty repairs for that model vehicle.

(c) To the extent required by any Federal or State law, whether statutory or common law, a vehicle manufacturer shall be required to provide a means for non-franchised repair facilities to perform emission performance warranty repairs.

(d) The manufacturer of each vehicle to which the warranty is applicable shall establish procedures as to the manner in which a claim under the

emission performance warranty is to be processed. The procedures shall:

(1) Provide for a final decision by the vehicle manufacturer within a reasonable time, not to exceed 30 days from the time at which the vehicle is initially presented for repair or within the time period during which an owner is required by local, State or federal law to have the vehicle repaired without incurring further penalties or sanctions (whichever is shorter), unless a delay

(i) Is requested by the vehicle owner, or

(ii) Is caused by an event not attributable to the vehicle manufacturer or the warranty repair facility; and

(2) Require that if the facility at which the vehicle is initially presented for repair is unable for any reason to honor the particular claim, then, unless this requirement is waived in writing by the vehicle owner, the repair facility shall forward the claim to an individual or office authorized to make emission performance warranty determinations for the manufacturer.

(e) Within the time period specified in paragraph (d) of this section the manufacturer shall:

(1) Notify the owner that it will honor the claim; or

(2) Provide the owner, in writing, with an explanation of the basis upon which the claim is being denied.

(f) Failure to notify an owner within the required time period (as determined under paragraph (d) of this section) for reasons that are not attributable to the vehicle owner or events which are not beyond the control of the vehicle manufacturer or the repair facility, shall result in the vehicle manufacturer being responsible for repairing the vehicle free to charge to the vehicle owner.

(g) The vehicle manufacturer shall incur all costs associated with a determination that an emission performance warranty claim is valid.

§ 85.2107 Warranty remedy.

(a) The manufacturer's obligation under the emission performance warranty shall be to make all adjustments, repairs or replacements necessary to assure that the vehicle complies with applicable emission standards of the U.S. Environmental Protection Agency, that it will continue to comply for the remainder of its useful life (if proper maintenance and operation are continued), and that it will operate in a safe manner. The manufacturer shall bear all costs incurred as a result of the above obligation, *except that* after the first 24 months or 24,000 miles (whichever first occurs) the manufacturer shall be responsible only for:

(1) The adjustment, repair or replacement of those components which have been installed in or on a vehicle for the sole or primary purpose of reducing vehicle emissions, and which were not in general use prior to model year 1968; and

(2) All other components which must be adjusted, repaired or replaced to enable a component repaired or replaced under paragraph (a)(1) of this section to perform properly.

(b) Under the Emissions Performance Warranty, the manufacturer shall be liable for the total cost of the remedy for any vehicle validly presented for repair to any authorized service facility authorized by the vehicle manufacturer. State or local limitations as to the extent of the penalty or sanction imposed upon an owner of a failed vehicle shall have no bearing on this liability.

(c) The remedy provided under paragraph (a) of this section shall include the repair or replacement of certified parts.

(d) If a manufacturer is unable (for reasons not attributable to the vehicle owner or events beyond the control of the vehicle manufacturer or an authorized repair facility) to repair a vehicle within the time period specified under § 85.2106(d) after the initial presentation of the vehicle to an authorized repair facility, then the owner shall be entitled to have the warranty remedy performed, at the expense of the manufacturer, by any repair facility of the owner's choosing.

§ 85.2108 Dealer certification.

(a) Upon the delivery of each new light-duty motor vehicle, the dealer shall furnish to the purchaser a certificate which states that:

(1) Based upon written notification furnished by the manufacturer, the dealer has knowledge that the vehicle is covered by an EPA Certificate of Conformity;

(2) Based upon a visual inspection of emissions control devices, there are no apparent deficiencies in the installation of such devices by the manufacturer. The visual inspection required by this subsection is limited to those emission control devices or portions thereof which are visible without removal or adjustment of any component or system of the vehicle, whether emissions related or otherwise.

(3) The dealer has performed all emission control system preparation required by the manufacturer prior to the sale of the vehicle, as set forth in the current predelivery service manual furnished by the manufacturer.

(b) The certificate shall further state that if the vehicle fails an EPA-approved emission test prior to the expiration of three months or 4,000 miles (whichever occurs first) from the date or mileage at the time of delivery of the vehicle to the ultimate purchaser, and the vehicle has been maintained and used in accordance with the written instructions for proper maintenance and use, then the vehicle manufacturer shall remedy the nonconformity under the emission performance warranty.

(c) For the purpose of this section, the term emission control devices shall be limited to all devices installed on a vehicle for the sole or primary purpose of controlling vehicle emissions and which were not in general use prior to 1968.

(d) A vehicle manufacturer shall provide the § 85.2108 remedy free of charge to the vehicle owner for any vehicle which, although maintained in accordance with the written instructions for proper maintenance and use, fails an emission short test prior to the expiration of three months or 4,000 miles from the time of sale to the ultimate purchaser, without regard to whether a penalty or sanction is imposed because of the emissions short-test failure.

(e) The dealer certification required by this section shall not be construed as either a representation or a warranty, express or implied, by the dealer that the emission control system or any part thereof is without defect nor that the system will properly perform.

[46 FR 38692, July 29, 1981]

§ 85.2109 Inclusion of warranty provisions in owner's manuals and warranty booklets.

(a) A manufacturer shall furnish with each new motor vehicle, a full explanation of the Emission Performance Warranty, including at a minimum the following information:

(1) A basic statement of the coverage of the emissions performance warranty as set out in § 85.2103. This shall be separated from any other warranty given by the manufacturer and shall be prefaced by the title "Emissions Performance Warranty" set in bold face type; and

(2) A list of all items which are covered by the emission performance warranty for the full useful life of the vehicle. This list shall contain all components which have been installed in or on a vehicle solely or primarily for the purpose of reducing vehicle emissions, except those components which were in general use prior to model year 1968. All items listed pursuant to this subsection shall be described in the same manner as they are likely to be described on a service facility work receipt for that vehicle; and

(3) A list or a reference to the location of the instructions for proper maintenance and use, together with the time and/or mileage interval at which such instructions are to be performed; and

(4) An explanation of the effect that the use of certified parts will have on the emission performance warranty. This explanation shall comport with the provisions of § 85.2105(b) and (c), including a statement in boldface type that maintenance, replacement, or repair of the emission control devices and systems may be performed by any automotive repair establishment or individual using any certified part; and

(5) Complete instructions as to when and how an owner may bring a claim under the emissions performance warranty, as governed by §§ 85.2104 and

85.2106. These instructions shall include:

(i) An explanation of the point in time at which a claim may be raised; and

(ii) Complete procedures as to the manner in which a claim may be raised; and

(iii) The provisions for manufacturer liability contained in § 85.2106(f) if the manufacturer fails to respond within the time period set in accordance with § 85.2106(d);

(6) An explanation that an owner may obtain further information concerning the emission performance warranty or that an owner may report violations of the terms of the Emission Performance Warranty by contacting the Director, Field Operation and Support Division (EN-397), Environmental Protection Agency, 401 "M" Street, SW., Washington, D.C. 20460.

(b) The warranty information shall be provided in the same document as other warranties provided with the vehicle.

(c) If a separate warranty booklet is provided with the vehicle, the owner's manual shall contain, at a minimum, the following information:

(1) A general list of all warranties covering the vehicle; and

(2) A statement that detailed warranty information can be found in the warranty booklet.

(d) If a separate warranty booklet is not provided with the vehicle, the information specified in paragraph (a) of this section shall be contained in the owner's manual.

§ 85.2110 Submission of owners' manuals and warranty statements to EPA.

(a) The manufacturer of each vehicle to which this subpart applies shall submit a copy to EPA of both the owner's manual and warranty booklet (if applicable) for each model vehicle, *except that*, if the same warranty information is to be provided for more than one model vehicle, the manufacturer may submit copies for a single model vehicle with a statement that such copies are complete and accurate representation of the warranty information provided with all other specified models.

(1) The owner's manuals and warranty booklets should be received by EPA 60 days prior to the introduction of the vehicle for sale.

(2) If the manuals and warranty booklets are not in their final printed format 60 days prior to the introduction of the vehicle for sale, a manufacturer may submit the most recent draft at that time, provided that final versions are submitted within 15 days of the final printing.

(b) All materials described in paragraph (a) of this section shall be sent to: Director, Field Operation and Support Division (EN-397), Office of Enforcement, Environmental Protection Agency, 401 "M" Street SW., Washington, D.C. 20460.

§ 85.2111 Warranty enforcement.

The following acts are prohibited and may subject a manufacturer to up to a $10,000 civil penalty for each offense:

(a) Selling or leasing a light duty vehicle without providing in writing the warranty information required by § 85.2109;

(b) Failing or refusing to comply with the terms and conditions of the Emission Performance Warranty with respect to any vehicle to which this subpart applies. Acts constituting such a failure or refusal shall include, but are not limited to, the following,

(1) Failure to honor a valid warranty claim,

(2) Performance of a warranty repair in a manner which cannot reasonably be expected to allow the vehicle to meet applicable emission standards for the remainder of its useful life,

(3) Failure of a manufacturer to reimburse a dealer or other designated agent for performance of a vehicle repair made pursuant to this subpart, and

(4) Failure of a manufacturer to supply a part necessary to perform a warranty repair within the time limit specified under § 85.2106(d), unless such failure is for a reason not attributable to the vehicle manufacturer or the warranty repair facility;

(c) To provide directly or indirectly in any communication to the ultimate

purchaser or any subsequent purchaser that the emission performance warranty coverage is conditioned upon the use of any name brand part, component, or system or upon service (other than a component or service provided without charge under the terms of the purchase agreement), unless the communication is made pursuant to a written waiver by the Administrator.

§ 85.2112 Applicability.

The provisions of §§ 85.2112 through 85.2122 apply to all automotive aftermarket parts (a) for which emission-critical parameters have been set forth in § 85.2122, and (b) which are to be installed in or on 1968 and later model year vehicles.

[45 FR 78458, Nov. 25, 1980]

§ 85.2113 Definitions.

As used in this subpart, all terms not defined shall have the meaning given them in the Act:

(a) "Act" means Part A of Title II of the Clean Air Act, 42 U.S.C. 7421 *et seq.* (formerly 42 U.S.C. 1857 *et seq.*) as amended.

(b) "Aftermarket Part" means any part offered for sale for installation in or on a motor vehicle after such vehicle has left the vehicle manufacturer's production line.

(c) "Aftermarket Part Manufacturer" means:

(1) A manufacturer of an aftermarket part or,

(2) A party that markets aftermarket parts under its own brand name, or,

(3) A rebuilder of original equipment or aftermarket parts, or

(4) A party that licenses others to sell its parts.

(d) "Agency" means the Environmental Protection Agency.

(e) "Deputy Assistant Administrator" means the Deputy Assistant Administrator for Mobile Source, Noise and Radiation Enforcement of the Agency or his or her delegate.

(f) "Certified Aftermarket Part" means any aftermarket part which has been certified pursuant to this subpart.

(g) "Director" means the Director of the Manufacturer's Operations Division of the Office of Enforcement of the Agency or his or her delegate.

(h) "Emission Warranty" means those warranties given by vehicle manufacturers pursuant to section 207 of the Act.

(i) "Emission-Related Standards" or "Emission-Critical Parameters" means those critical parameters and tolerances which, if equivalent from one part to another, will not cause the vehicle to exceed applicable emission standards with such parts installed.

(j) "Engine Family" means the basic classification unit of a vehicle's product line for a single model year used for the purpose of emission-data vehicle or engine selection and as determined in accordance with 40 CFR 86.078-24.

(k) "Vehicle or Engine Configuration" means the specific subclassification unit of an engine family as determined by engine displacement, fuel system, engine code, transmission and inertia weight class as applicable.

[45 FR 78458, Nov. 25, 1980]

§ 85.2114 Basis of Certification.

(a) An automotive aftermarket part manufacturer may certify a part either:

(1) On the basis of demonstrating conformance of that part with all of the relevant Emission-Critical Parameters set forth for that part in § 85.2122; or

(2) On the basis of performing emission tests in each applicable vehicle configuration for which the part is to be certified in accordance with the requirements of this section.

(b) The only emission test on which certification can be made pursuant to paragraph (a)(2) of this section is the Federal Test Procedure as set forth in the applicable portions of 40 CFR Part 86 (except as provided in paragraph (b)(3)).

(1) At least two emission tests are required in order to certify an aftermarket part pursuant to paragraph (a)(2). These tests shall be performed according to the Federal Test Procedure on a vehicle set to the vehicle manufacturer's specifications and in which the part to be certified has been installed.

(2) The test results must demonstrate that the proper installation of the certified aftermarket part will not cause the vehicle to fail to meet any applicable Federal emission requirements under section 202 of the Act.

(3) The following portions of the Federal Test Procedure are not required to be performed when certifying a part in accordance with paragraph (a)(2):

(i) Compliance with evaporative emissions standard if the manufacturer of that part has a reasonable basis for believing that the use of the part has no effect on the vehicle's evaporative emissions,

(ii) Compliance with exhaust emissions standard if the part manufacturer has a reasonable basis for believing that the part affects only the evaporative emissions of a vehicle, and

(iii) Other portions therein which the part manufacturer believes are not relevant provided that the part manufacturer has requested and been granted a waiver in writing by the Director for excluding such portion.

(4) For the purpose of certifying parts on the basis of emission testing for use in vehicle or engine configurations other than those tested under paragraph (a)(2), the certifier may apply the results of tests performed under paragraph (a)(2) upon a showing set out in the notification of intent to certify that the configuration tested represents the "worst case" with respect to emissions of those configurations for which the results are to be applicable.

(i) Such a showing shall include:

(A) A technical discussion that supports the conclusion that the configuration tested represents the worst case, and

(B) All data that support the above conclusion.

(ii) The worst case configuration shall be that configuration which is least likely to meet the applicable emission standards among those configurations for which the emission test results under paragraph (a)(2) are to be applied. This determination:

(A) Shall be based on a technical judgment of the impact of the particular design or calibration of a particular parameter or combination of parameters and/or an analysis of appropriate data, and

(B) Shall only be applicable for configurations that are required to meet the same or less stringent (higher) emission standards than those applicable to the configuration tested.

(c) An aftermarket part may be certified in accordance with § 85.2114(a)(1) only if the part's emission-critical parameters as set forth in § 85.2122(a) are equivalent to those of the original equipment part it is to replace.

(1) A part that replaces more than one part may be certified in accordance with § 85.2114(a)(1) only if the part meets the applicable parameters of § 85.2122 for each part or parts which the part is to replace. If a part is to replace more than one part or an entire system, compliance must be demonstrated for all emission critical parameters involved, except those which relate solely to the interface between the parts being replaced by the modified part.

(2) Compliance with the Emission-Critical Parameters may be demonstrated by compliance with the relevant Test Procedure and Criteria specified in the Appendix to this Subpart V. An aftermarket part manufacturer may choose to utilize other tests and methods to demonstrate compliance with § 85.2114(a)(1) provided that the tests and methods are of equal validity and reliability to those provided in the Appendix.

(3) An aftermarket part manufacturer may certify a part on the basis of conformance with all Emission-Critical Parameters only after the part manufacturer has performed such tests, analyses, or other procedures necessary to ascertain with a high degree of certainty the emission-critical parameter specifications and tolerances for the original equipment part for which a certified part is to be a replacement.

(i) If information is available to identify the applicable emission-critical parameters, the prospective certifier must use such information.

(ii) If sampling and analysis of original equipment parts is relied upon, the prospective certifier must use sound statistical sampling techniques to as-

certain the mean and range of the applicable emission parameters.

(4) Certification in accordance with § 85.2114(a)(1) or (2) must be based upon tests utilizing representative production aftermarket parts selected in a random manner in accordance with accepted statistical procedures.

(d) Before a part may be certified pursuant to this subpart, evidence must exist to demonstrate that the part will not cause a vehicle to exceed emission standards during the full interval for which the part is to be certified.

(1) For parts without a scheduled replacement, this interval shall be the useful life of the motor vehicle or motor vehicle engine.

(2) If a Recommended Durability Procedure is contained in the Appendix to this Subpart V for a part, then that test or another test of equivalent validity and reliability shall be used to demonstrate the durability of the part.

(3) An aftermarket part manufacturer may use reasonable engineering analyses or testing to demonstrate durability for all parts for which no Recommended Durability Procedure is contained in the Appendix.

(4) If any provision of 40 CFR Part 86 establishes a minimum replacement or service interval for a part during vehicle or engine certification, then no aftermarket part of that type may be certified with a shorter replacement or service interval.

(e) Installation of any certified part shall not result in the removal or rendering inoperative of any original equipment component, require the readjustment of any component to other than the original manufacturer specifications, cause or contribute to an unreasonable risk to the public health, welfare or safety, or result in any additional range of parameter adjustability or accessibility to adjustment than that of the vehicle manufacturer's parts.

[45 FR 78459, Nov. 25, 1980]

§ 85.2115 Notification of Intent To Certify.

(a) At least 45-days prior to the sale of any certified automotive aftermarket part, notification of the intent to certify must be received by the Agency.

(1) The notification shall include:

(i) Identification of each part to be certified.

(ii) Identification of all vehicle or engine configurations for which the part is being certified including make(s), model(s), year(s), engine size(s) and all other specific configuration characteristics necessary to assure that the part will not be installed in any configuration for which it has not been certified.

(iii) A description of the tests and methods utilized to demonstrate compliance with §§ 85.2114(a)(1) and 85.2114(c); *except that,* if the procedure utilized is recommended in the Appendix, then only a statement to this effect is necessary. If certification is sought in accordance with § 85.2114(a)(2), the results of all emission tests performed shall be included. A description of all statistical methods and analyses used to determine the emission-critical parameters of the original equipment parts and compliance of the certified part(s) with those parameters including numbers of parts tested, selection criteria, means, variance, etc.

(iv) A statement that the aftermarket part manufacturer accepts, as a condition of certification, the obligation to provide and comply with the warranty contained in § 85.2117;

(v) A statement of commitment and willingness to comply with all the relevant terms and conditions of this subpart;

(vi) The service intervals of the part, including maintenance and replacement intervals in months and/or miles, as applicable, if different than the original equipment requirements;

(vii) A statement, if applicable, that the part will not meet the labelling requirements of § 85.2119(a) and a description of the markings the aftermarket manufacturer intends to put on the part in order to comply with § 85.2119(b);

(viii) The information required pursuant to § 85.2114(b)(4) if applicable; and

(ix) The office or officer of the part manufacturer authorized to receive

correspondence regarding certification requirements pursuant to this subpart.

(2) The notification shall be signed by an individual attesting to the accuracy and completeness of the information supplied in the notification.

(3) Notification to the Agency shall be by certified mail or another method by which date of receipt can be established.

(4) The notification shall be submitted to: Director, Manufacturer's Operations Division (EN-340), 401 "M" Street SW., Washington, D.C. 20460.

(b) A part may be sold as certified 45 days after the receipt by the Agency of the notification given pursuant to this subsection provided that the Agency has not notified the part manufacturer otherwise.

[45 FR 78460, Nov. 25, 1980]

§ 85.2116 Objections to Certification.

(a) At any time prior to the end of the 45-day period after a notification of intent to certify an aftermarket part is received as specified in § 85.2115, the Director may notify the manufacturer of the aftermarket part that such aftermarket part may not be certified pending further investigation. The basis upon which this notification shall be made may include, but not be limited to, information or test results which indicate:

(1) Compliance with the applicable emission-critical parameters was not achieved or that the testing methods used to demonstrate compliance with the emission-critical parameters were inadequate;

(2) The part is to be certified on the basis of emission testing, and the procedure used in such tests was not in compliance with those portions of the Federal Test Procedure not waived pursuant to § 85.2114(b);

(3) Use of the certified part may cause a vehicle to exceed any applicable emission requirements;

(4) The durability requirement of § 85.2114(c) has not been complied with;

(5) Use of the certified part could cause or contribute to an unreasonable risk to public health, welfare or safety in its operation or function;

(6) Installation of the certified part requires procedures or equipment which would likely cause it to be improperly installed under normal conditions or would likely result in a vehicle being misadjusted; or

(7) Information and/or data required to be in the notification of intent to certify § 85.2115 have not been provided.

(b) The aftermarket part manufacturer must respond in writing to the statements made in the notification by the Director, or the aftermarket part manufacturer shall withdraw its notification of intent to certify.

(1) Any party interested in the outcome of a decision as to whether a part may be certified may provide the Director with any relevant written information up to ten days after the manufacturer responds to the Director's objection.

(2) Any interested party may request additional time to respond to the information submitted by the part manufacturer. The Director upon a showing of good cause by the interested party may grant an extension of time to reply up to 30 days.

(3) The part manufacturer may reply to information submitted by interested parties. Notification of intent to reply shall be submitted to the Director within 10 days of the date information from interested parties is submitted to the Director.

(4) The Director may, at his or her discretion, allow oral presentations by the aftermarket manufacturer or any interested party in connection with a contested part certification.

(c) If an objection has been sent to an aftermarket part manufacturer pursuant to paragraph (a) of this section, the Director shall, after reviewing all pertinent data and information, render a decision and inform the aftermarket part manufacturer in writing as to whether such part may be certified and, if so, under what conditions the part may be certified. The written decision shall include an explanation of the reasons therefor.

(1) The decision by the Director shall be provided to the manufacturer within 30 working days of receipt of all necessary information by the manufacturer or interested parties, or of the date of any oral presentation re-

garding the certification, whichever occurs second.

(2) A copy of the decision shall be sent to all identified interested parties.

(3) Within 20 days of receipt of a decision made pursuant to this subsection, any party may file a written appeal to the Deputy Assistant Administrator. The Deputy Assistant Administrator may, in his or her discretion, allow additional oral or written submissions, prior to rendering a final decision. The schedule for such submission shall be in accordance with the schedule specified in § 85.2116(b).

(4) If no party files an appeal with the Deputy Assistant Administrator within 20 days, then the decision of the Director shall be final.

(5) The Deputy Assistant Administrator shall make a final decision regarding the certification of a part within 30 working days of receipt of all necessary information by the part manufacturer or from the date of any oral presentation, whichever occurs later.

(6) A copy of all final decisions made under this section shall be published in the FEDERAL REGISTER.

[45 FR 78460, Nov. 25, 1980]

§ 85.2117 Warranty.

(a) As a condition of certification, the aftermarket part manufacturer shall warrant that if the certified part is properly installed it will not cause a vehicle to exceed Federal emission requirements as adjudged by an emission short test approved by EPA under section 207(b)(1) of the Act.

(b) The aftermarket part manufacturer's minimum obligation under this warranty shall be to reimburse vehicle manufacturers for all reasonable expenses incurred as a result of honoring a valid emission performance warranty claim which arose because of the use of the certified aftermarket part.

(c) Nothing in this section precludes a part manufacturer from expanding its warranty to include reimbursement to any additional parties it desires.

[45 FR 78461, Nov. 25, 1980]

§ 85.2118 Changes after certification.

The aftermarket part manufacturer shall be required to recertify any part which:

(a) Was certified pursuant to § 85.2114(a)(1) and to which modifications are subsequently made which could affect the results of any test or judgment made that the part meets all of the applicable Emission-Critical Parameters;

(b) Was certified pursuant to § 85.2114(a)(2) and to which modifications are made which are likely to affect emissions or the capability of the part to meet any other requirement of this subpart; or

(c) Was certified and is subsequently modified in a manner affecting the durability of the part or any emission control device, engine or the vehicle upon which such part is installed.

[45 FR 78461, Nov. 25, 1980]

§ 85.2119 Labeling requirements.

(a) Except for those components specified in paragraph (b) of this section, each part certified pursuant to these regulations shall have "Certified to EPA Standards" and the name of the aftermarket part manufacturer or other party designated to determine the validity of warranty claims placed on the part.

(b) In lieu of the information contained in paragraph (a) of this section, the part may contain identification markings that can be used to refer to the information required in paragraph (a) of this section. A description of the marking and notification that such marking is intended in lieu of the information required above, must be made to the Agency in the Notification of Intent to Certify.

(c) The package in which the certified aftermarket part is contained must have the following information conspicuously placed thereon:

(1) The statement "Certified by (name of manufacturer or warranter) to EPA Emission Standards",

(2) A list of the vehicles or engines (in accordance with § 85.2115(a)(1)(ii)) for which the part has been certified,

(3) A statement of the maintenance or replacement interval for which the part has been certified, if the interval

is of a shorter duration than the interval specified in the written instructions for proper maintenance and use for the original equipment,

(4) A description of the maintenance necessary to be performed on the part in the proper maintenance and use of the part, if such maintenance is in addition to or different from that maintenance necessary on the original equipment part, and

(5) The instructions for proper installation if different from the vehicle manufacturer's recommended installation instruction for that part.

(d) The information required by paragraphs (c)(4) and (5) of this section may be provided on a written insert with the certified aftermarket part if the insert also contains the information required in paragraphs (c)(1), (2) and (3) of this section.

(e) The information required by paragraph (c)(2) of this section may be provided in a catalog rather than on the package or on an insert: *Provided,* That access to the catalog is readily available to purchasers and installers of the part.

(f) When an aftermarket part manufacturer desires to certify existing in-service stocks of its products, it may do so provided:

(1) The part does not differ in any operational or durability characteristic from the aftermarket parts specified in the notification made pursuant to § 85.2115, and

(2) A supplemental information sheet is made available to all parties selling the part.

(i) The supplemental sheet shall be made available in sufficient quantities so that it can be provided with all parts sold as certified, and

(ii) The supplemental sheet shall contain all of the information specified in paragraph (c) of this section.

[45 FR 78461, Nov. 25, 1980]

§ 85.2120 Maintenance and submittal of records.

(a) For each certified aftermarket part, the aftermarket part manufacturer must establish, maintain and retain for 5 years the following adequately organized and indexed records:

(1) Detailed production drawings showing all dimensions, tolerances, performance requirements and material specifications and any other information necessary to completely describe the part;

(2) A description of the testing program, including all production part sampling techniques used to verify compliance of the certified aftermarket part with the applicable Emission-Critical Parameters and durability requirements;

(3) All data obtained during testing of the part and subsequent analyses based on that data, including the milege and the vehicle or engine configuration determinants if emission testing is utilized as the basis for certification;

(4) All information used in determining those vehicles for which the part is represented as being equivalent from an emissions standpoint to the original equipment part;

(5) A description of the quality control plan used to monitor production and assure compliance of the part with the applicable certification requirements;

(6) All data taken in implementing the quality control plan, and any subsequent analyses of that data;

(7) A description of all the methodology, analysis, testing and/or sampling techniques used to ascertain the emission critical parameter specifications of the originial equipment part; and

(8) All in-service data, analyses performed by the manufacturer and correspondence with vendors, distributors, consumers, retail outlets or vehicle manufacturers regarding any design, production or in-service problems associated with 25 or more of any certified part.

(b) The records required to be maintained in paragraph (a) of this section shall be made available to the Agency upon the written request of the Director.

(c) For parts certified only for vehicles with less than 5 years of emission performance warranty coverage remaining, records must be kept for 3 years or until they determine that approximately 80% of the applicable ve-

hicles are outside the warranty period, whichever occurs second.

(d) This section shall expire 5 years from the effective date of this regulation unless renewed prior to that date.

[45 FR 78461, Nov. 25, 1980]

§ 85.2121 Decertification.

(a) The Director may notify an aftermarket part manufacturer that the Agency has made a preliminary determination that one or more parts should be decertified.

(1) Such a preliminary determination may be made if there is reason to believe that the part manufactured has failed to comply with §§ 85.2112 through 85.2122. Information upon which such a determination will be made includes but is not limited to the following.

(i) Tests required to be performed to demonstrate compliance of the part with the applicable Emission-Critical Parameters

(A) Were not performed on the part(s), or

(B) Were insufficient to demonstrate compliance;

(ii) The part was certified on the basis of emission tests, and

(A) The procedures used in such tests were not in substantial compliance with a portion or portions of the Federal Test Procedure which were not waived pursuant to § 85.2114(b)(4); or

(B) The emission results were not in compliance with the requirements of § 85.2114(b);

(iii) Use of the certified part is causing vehicle emissions to exceed emission requirements for any regulated pollutant;

(iv) Use of the certified part causes or contributes to an unreasonable risk to public health, welfare or safety or severely degrades drivability operation or function;

(v) The part has been modified in a manner requiring recertification pursuant to § 85.2118; or

(vi) The manufacturer of such part has not established, maintained or retained the records required pursuant to § 85.2120.

(2) Notice of a preliminary determination to decertify shall contain:

(i) A description of the noncomplying part(s);

(ii) The basis for the Director's preliminary decision; and

(iii) The date by which the manufacturer must

(A) Terminate the sale of the part as a certified part, or

(B) Make the necessary change (if so recommended by the Agency), and

(C) Request an opportunity in writing to dispute the allegations of the preliminary decertification.

(b) If the aftermarket part manufacturer requests an opportunity to respond to the preliminary determination, the manufacturer and other parties interested in the Director's decision whether to decertify a part may, within 15 days of the date of the request, submit written presentations, including the relevant information and data, to the Director. The Director, in his or her discretion, may provide an opportunity for oral presentations.

(1) Any interested party may request additional time to respond to the information submitted by the part manufacturer. The Director upon a showing of good cause by the interested party may grant an extension of time to reply up to 30 days.

(2) The part manufacturer may have an extension of up to 30 days to reply to information submitted by interested parties. Notification of intent to reply shall be submitted to the Director within 10 days of the date information from interested parties is submitted to the Director.

(c) If a part manufacturer has disputed the allegations of the preliminary decisions, the Director shall, after reviewing any additional information, notify the aftermarket part manufacturer of his or her decision whether the part may continue to be sold as certified. This notification shall include an explanation upon which the decision was made and the effective date for decertification, where appropriate.

(d) Within 20 days from the date of a decision made pursuant to paragraph (c) of this section, any adversely affected party may appeal the decision to the Deputy Assistant Administrator.

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(1) A petition for appeal to the Deputy Assistant Administrator must state all of the reasons why the decision of the Director should be reversed.

(2) The Deputy Assistant Administrator may, in his or her discretion, allow additional oral or written testimony.

(3) If no appeal is filed with the Deputy Assistant Administrator within the permitted time period, the decision of the Director shall be final.

(e) If a final decision is made to decertify a part under paragraph (d) of this section, the manufacturer of such part shall notify his immediate customers (other than retail customers) that, as of the date of the final determination, the part in question has been decertified. The part manufacturer shall offer to replace decertified parts in the customer's inventory with certified replacement parts or, if unable to do so, shall at the customer's request repurchase such inventory at a reasonable price.

(f) Notwithstanding the requirements of paragraph (e) of this section, a part purchased by a vehicle owner as certified, shall be considered certified pursuant to this subpart.

[45 FR 78462, Nov. 25, 1980]

§ 85.2122 Emission-Critical Parameters.

(a) The following parts may be certified in accordance with § 85.2114(a)(1):

(1) *Carburetor Vacuum Break (Choke Pull-Off).* (i) The emission-critical parameters for carburetor vacuum breaks are:

(A) Diaphragm Displacement

(B) Timed Delay

(C) Modulated Stem Displacement

(D) Modulated Stem Displacement Force

(E) Vacuum Leakage

(ii) For the purposes of this paragraph:

(A) "Diaphragm Displacement" means the distance through which the center of the diaphragm moves when activated. In the case of a non-modulated stem, diaphragm displacement corresponds to stem displacement.

(B) "Timed Delay" means a delayed diaphragm displacement controlled to occur within a given time period.

(C) "Modulated Stem Displacement" means the distance through which the modulated stem may move when actuated independent of diaphragm displacement.

(D) "Modulated Stem Displacement Force" means the amount of force required at start and finish of a modulated stem displacement.

(E) "Vacuum Leakage" means leakage into the vacuum cavity of a vacuum break.

(F) "Vacuum Break" ("Choke Pull-off") means a vacuum-operated device to open the carburetor choke plate a predetermined amount on cold start.

(G) "Modulated Stem" means a stem attached to the vacuum break diaphragm in such a manner as to allow stem displacement independent of diaphragm displacement.

(H) "Vacuum Purge System" means a vacuum system with a controlled air flow to purge the vacuum system of undesirable manifold vapors.

(2) *Carburetor Choke Thermostats.* (i) The emission-critical parameters for all Choke Thermostats are:

(A) Thermal Deflection Rate

(B) Mechanical Torque Rate

(C) Index Mark Position

(ii) The emission-critical parameters for Electrically-Heated Choke Themostats are:

(A) Those parameters set forth in paragraph (a)(2)(i) of this section

(B) Time to rotate coil tang when electrically energized

(C) Electrical circuit resistance

(D) Electrical switching temperature

(iii) For the purpose of this paragraph:

(A) "Choke" means a device to restrict air flow into a carburetor in order to enrich the air/fuel mixture delivered to the engine by the carburetor during cold-engine start and cold-engine operation.

(B) "Thermostat" means a temperature-actuated device.

(C) "Electrically-heated Choke" means a device which contains a means for applying heat to the thermostatic coil by electrical current.

(D) "Thermostatic Coil" means a spiral-wound coil of thermally-sensitive material which provides rotary force (torque) and/or displacement as a function of applied temperature.

(E) "Thermostatic Switch" means an element of thermally-sensitive material which acts to open or close an electrical circuit as a function of temperature.

(F) "Mechanical Torque Rate" means a term applied to a thermostatic coil, defined as the torque accumulation per angular degree of deflection of a thermostatic coil.

(G) "Thermal Deflection Rate" means the angular degrees of rotation per degree of temperature change of the thermostatic coil.

(H) "Index or Index Mark" means a mark on a choke thermostat housing, located in a fixed relationship to the thermostatic coil tang position to aid in assembly and service adjustment of the choke.

(I) "PTC Type Choke Heaters" means a positive termperature coefficient resistant ceramic disc capable of providing heat to the thermostatic coil when electrically energized.

(3) *Carburetor Accelerator Pumps.* (i) The emission-critical parameter for accelerator pumps (plungers or diaphragms) is the average volume of fuel delivered per stroke by the pump within prescribed time limits.

(ii) For the purpose of this paragraph an "Accelerator Pump (Plunger or Diaphragm)" means a device used to provide a supplemental supply of fuel during increasing throttle opening as required.

(4) *Positive Crankcase Ventilation (PCV) Valves.* (i) The emission-critical parameter for a PCV valve is the volume of flow as a function of pressure differential across the valve.

(ii) For the purposes of this paragraph a "PCV Valve" means a device to control the flow of blow-by gasses and fresh air from the crankcase to the fuel induction system of the engine.

(5) *Breaker Points.* (i) The emission-critical parameters for breaker points are:

(A) Bounce

(B) Dwell Angle

(C) Contact Resistance

(ii) For the purposes of this paragraph:

(A) "Breaker Point" means a mechanical switch operated by the distributor cam to establish and interrupt the primary ignition coil current.

(B) "Bounce" means unscheduled point contact opening(s) after initial closure and before scheduled reopening.

(C) "Dwell Angle" means the number of degrees of distributor mechanical rotation during which the breaker points are conducting current.

(D) "Contact Resistance" means the opposition to the flow of current between the mounting bracket and the insulated terminal.

(6) *Capacitors/Condensers.* (i) The emission-critical parameters for capacitors/condensers are:

(A) Capacitance

(B) Series Resistance

(C) Breakdown Voltage

(ii) For the purposes of this paragraph:

(A) "Capacitance" means the property of a device which permits storage of electrically-separated charges when differences in electrical potential exist between the conductors and measured as the ratio of stored charge to the difference in electrical potential between conductors.

(B) "Series Resistance" means the sum of resistances from the condenser plates to the condenser's external connections.

(C) "Breakdown Voltage" means the voltage level at which the capacitor fails.

(D) "Capacitor/Condenser" means a device for the storage of electrical energy consisting of two oppositely charged conducting plates separated by a dielectric and which resists the flow of direct current.

(7) *Distributor Caps and/or Rotors.* (i) The emission-critical parameters for distributor caps and/or rotors are:

(A) Physical and Thermal Integrity

(B) Dielectric Strength

(C) Flashover

(ii) For the purposes of this paragraph:

(A) "Flashover" means the discharge of ignition voltage across the surface of the distributor cap and/or rotor rather than at the spark plug gap.

(B) "Dielectric Strength" means the ability of the material of the cap and/or rotor to resist the flow of electric current.

(C) "Physical and Thermal Integrity" means the ability of the material of the cap and/or rotor to resist physical and thermal breakdown.

(8) *Spark Plugs.* (i) The emission critical parameters for spark plugs are:

(A) Heat Rating

(B) Gap Spacing

(C) Gap Location

(D) Flashover

(E) Dielectric Strength

(ii) For the purposes of this paragraph:

(A) "Spark Plug" means a device to suitably deliver high tension electrical ignition voltage to the spark gap in the engine combustion chamber.

(B) "Heat Rating" means that measurement of engine indicated mean effective pressure (IMEP) value obtained on the engine at a point when the supercharge pressure is 25.4mm (one inch) Hg below the preignition point of the spark plug, as rated according to SAE J549A Recommended Practice.

(C) "Gap Spacing" means the distance between the center electrode and the ground electrode where the high voltage ignition arc is discharged.

(D) "Gap Location" means the position of the electrode gap in the combustion chamber.

(E) "Dielectric Strength" means the ability of the spark plug's ceramic insulator material to resist electrical breakdown.

(F) "Flashover" means the discharge of ignition voltage at any point other than at the spark plug gap.

(9) *Inductive System Coils.* (i) The emission-critical parameters for inductive system coils are:

(A) Open Circuit Voltage Output

(B) Dielectric Strength

(C) Flashover

(D) Rise Time

(ii) For the purposes of this paragraph:

(A) "Coil" means a device used to provide high voltage in an inductive ignition system.

(B) "Flashover" means the discharge of ignition voltage across the coil.

(C) "Dielectric Strength" means the ability of the material of the coil to resist electrical breakdown.

(D) "Rise Time" means the time required for the spark voltage to increase from 10% to 90% of its maximum value.

(10) *Primary Resistors.* (i) The emission-critical parameter for primary resistors is the DC resistance.

(ii) For the purpose of this paragraph, a "Primary Resistor" means a device used in the primary circuit of an inductive ignition system to limit the flow of current.

(11) *Breaker Point Distributors.* (i) The emission-critical parameters for breaker point distributors are:

(A) Spark Timimg

(*1*) Centrifugal Advance Characteristics

(*2*) Vacuum Advance Characteristics

(B) Dwell Angle

(C) Breaker point contact operation

(D) Electrical resistance to ground

(E) Capacity for compatibility with generally available original equipment and certified replacement parts listed in § 85.2112(a) (5), (6), (7), and (9).

(ii) For the purposes of this paragraph:

(A) "Distributor" means a device for directing the secondary current from the induction coil to the spark plugs at the proper intervals and in the proper firing order.

(B) "Distributor Firing Angle" means the angular relationship of breaker point opening from one opening to the next in the firing sequence.

(C) "Dwell Angle" means the number of degrees of distributor mechanical rotation during which the breaker points are capable of conducting current.

(12) Engine Valves [Reserved]

(13) Camshafts [Reserved]

(14) Pistons [Reserved]

(15) *Oxidizing Catalytic Converter*

(i) The emission-critical parameters for oxidizing catalytic converters are:

(A) Conversion Efficiency

(B) Light-off Time

(C) Mechanical and Thermal Integrity

(ii) For the purposes of this paragraph including the relevant test procedures in the Appendix:

(A) "Catalytic Converter" means a device installed in the exhaust system of an internal combustion engine that utilizes catalytic action to oxidize hydrocarbon (HC) and carbon monoxide

(CO) emissions to carbon dioxide (CO_2) and water (H_2O).

(B) "Conversion Efficiency" means the measure of the catalytic converter's ability to oxidize HC/CO to CO_2/H_2O under fully warmed-up conditions stated as a percentage calculated by the following formula:

$$\frac{\text{Inlet conc.} - \text{outlet conc.}}{\text{Inlet conc.}} \times 100$$

(C) "Light-off Time" or "LOT" means the time required for a catalytic converter (at ambient temperature 68-86°F) to warm-up sufficiently to convert 50% of the incoming HC and CO to CO_2 and H_2O.

(D) "Peak Air Flow" means the maximum engine intake mass air flow rate measure during the 195 second to 202 second time interval of the Federal Test Procedure.

(E) "Feed Gas" means the chemical composition of the exhaust gas measured at the converter inlet.

(F) "Aged Catalytic Converter" means a converter that has been installed on a vehicle or engine stand and operated thru a cycle specifically designed to chemically age, including exposure to representative lead concentrations, and mechanically stress the catalytic converter in a manner representative of in-use vehicle or engine conditions.

(G) "Mechanical and Thermal Intergrity" means the ability of a converter to continue to operate at its previously determined efficiency and light-off time and be free from exhaust leaks when subject to thermal and mechanical stresses representative of the intended application.

(16) *Air Cleaner Filter Element.* (i) The emission-critical parameters for Air Cleaner Filter Elements are:

(A) Pressure drop

(B) Efficiency

(ii) For the purpose of this paragraph:

(A) "Air Cleaner Filter Element" means a device to remove particulates from the primary air that enters the air induction system of the engine.

(B) "Pressure Drop" means a measure, in kilopascals, of the difference in static pressure measured immediately upstream and downstream of the air filter element.

(C) "Efficiency" means the ability of the air cleaner or the unit under test to remove contaminant.

(17) *Electronic Inductive Ignition System and Components* [Reserved]

(18) *Electronic Inductive Distributors* [Reserved]

(b) Additional part standards. [Reserved]

[45 FR 78462, Nov. 25, 1980]

Appendix—Recommended Test Procedures and Test Criteria and Recommended Durability Procedures to Demonstrate Compliance with Emission Related Standards

A. Carburetor Vacuum Break (Choke Pull-Off)

1. *Test Procedure and Criteria*

a. Vacuum leakage: Apply 457 ± 13mm (18.0 ± 0.5 inches) Hg. vacuum to the vacuum unit to achieve full diaphragm displacement. Seal vacuum source to unit. There shall be no visible loss of diaphragm displacement or drop in vacuum gauge reading after a 15 second observation. Vacuum purge system and diaphragm displacement adjusting screw holes should be temporarily sealed during this test when applicable.

b. Diaphragm displacement: At stabilized temperature of − 29°C and 121°C (− 20°F and 250°F) with 457 ± 13mm (18.0 ± 0.5 inches) Hg. vacuum applied to unit, the diaphragm displacement shall be within ± 1mm (0.04 inches) of the nominal original equipment displacement. The vacuum purge system must be open during this test when applicable. Adjusting screws that limit displacement should be temporarily removed and adjusting screw holes temporarily sealed during this test.

c. Timed delay (when applicable): With 457 ± 13mm (18.0 ± 0.5 inches) Hg. applied to the unit, the vacuum break diaphragm displacement shall occur within ± 20% of the original equipment time over the specified range of displacement. The diaphragm displacement shall be timed over the same distance for the original equipment as the replacement part and shall not be less than 60% of the total displacement range. The vacuum purge system must be open and the adjusting screw holes should be temporarily sealed during this test when applicable.

d. Modulated stem displacement (when applicable): With a force sufficient to extend the modulated stem to its full displacement, the displacement shall be within

· 0.8mm (± 0.03 inches) of the original equipment specification.

e. Modulated stem displacement force (when applicable): The force required to start and finish the modulated stem displacement shall be within ± 35% of the original equipment specification for forces up to 142 grams (5 ounces) and shall be within ± 20% of the original equipment specification for forces exceeding 142 grams (5 ounces).

2. *Durability Procedures:* After 250,000 full displacement cycles (from atmospheric pressure to a minimum of 530mm (21 inches) Hg. vacuum at a temperature of 79 C (175 F)) in air, the following conditions shall be met:

a. Diaphragm displacement shall not degrade more than 10% from the original test measurements of paragraph 1.b. above.

b. Timed delay shall not degrade more than 10% from the original test measurement in paragraph 1.c. above.

c. Following these tests, the units must be free of visible defects.

B. Carburetor Choke Thermostats

1. *Test Procedures and Criteria*

a. All chokes

i. *Thermal deflection rate*

When tested on a suitable fixture, the deflection rate shall be within ±6% of the original equipment value. The initial temperature and final temperature for purposes of this test may vary but shall exhibit a test temperature range of at least 44°C (80°F). Recommended test equipment, test procedures, and associated calculations are outlined in ASTM B389 (latest revision) or American National Standards Institute Z155-20.

ii. *Mechanical torque rate*

When tested on a suitable fixture, the torque rate shall be within ±12% of the mean original equipment value. Recommended test equipment, test procedures, and associated calculations are outlined in ASTM B362 (latest revision) or American National Standards Institute Z155-18 (latest revision).

iii. *Index mark position*

When stabilized for four hours at room temperature, the relative position of the thermostatic coil outer tang or loop and the index mark, when corrected to 24°C (75°F), shall be within ±5 angular degrees of the mean original equipment positions.

b. Electrically-heated Chokes

i. *Time to rotate coil tang*

When tested on a suitable fixture, the time to rotate through a prescribed angle at a prescribed temperature and prescribed voltage, for the specfic choke device under test shall be within ±12 seconds or ±25% of the mean original equipment value whichever is greater.

ii. *Electrical circuit resistance*

In an electrically-heated choke utilizing PTC type choke heater, the circuit resistance shall be within ±1.5 ohms of the mean original equipment value at 24±3°C (75°±5°F) unenergized.

iii. *Electrical switching temperature*

In an electrically heated choke thermostat utilizing a thermostatic disc switch in the electrical circuit, the temperature to open the circuit shall be within ±5.5°C (10°F) and the temperature to close the circuit shall be within ±11°C (20°F) of the mean original equipment value. Circuit opening temperature shall be measured on a decreasing temperature change, and the circuit closing temperature shall be measured on an increasing temperature change.

C. Carburetor Accelerator Pumps

1. *Test Procedure and Criteria*

a. Expose plunger or diaphragm assembly to temperatures of −30°C (−20°F) for 70 hours and at 70°C (158°F) for 24 hours, with a commercial grade fuel or equivalent.

b. Within one hour after temperature exposure of 1.a. above, each plunger or diaphragm assembly, when installed in an applicable carburetor or test fixture, shall at room temperature deliver a volume of test fluid (Stoddard solvent or equivalent) from a 10 stroke cycle,* within ±30% of the volume from a 10 stroke cycle of an original equipment plunger or diaphragm assembly.

2. *Durability Procedure:* After 250,000 operational cycles, at approximately 30 cycles per minute at room temperature in test fluid, the output of the plunger/diaphragm shall not drop below 90% of the low limit as established in 1.b.

D. Positive Crankcase Ventilation (PCV) Valve

1. *Test Procedure and Criteria*

a. Measure the flow of the PCV valve in standard cubic feet per minute (SCFM) vs. pressure differential across the valve over a range of operating pressures from 4-22 inches Hg., at standard atmospheric conditions (21.1° C (70° F) at 755mm (29.92 inches).

b. A PCV valve shall flow within the vehicle manufacturer's specifications or shall meet the following criteria: Whenever the mean of the original equipment flow curve is below 1 SCFM, a maximum deviation of the mean replacement PCV valve shall not exceed ± 0.1 SCFM. Whenever the mean original equipment curve is equal to or greater than 1 SCFM, a maximum deviation of the mean of the replacement PCV valve

*10 stroke cycle: 10 strokes from closed throttle plate position to wide open throttle plate position occurring within a 15-25 second time period.

shall not exceed ± 10%. The total flow tolerance of the replacement valve shall not exceed the original equipment variation from the mean, at any pressure differential.

2. *Durability Procedure:* The flow of any specific PCV valve must not deviate from the flow curve of the original equipment PCV valve by more than the total original allowable tolerance when each is similarly operated in the intended vehicle application over the service interval stated by the certifier.

E. Breaker Points

1. *Test Procedures and Criteria*

a. Set up test system circuit and equipment per Figure 1 with an OE breaker point assembly. Connect the primary to a 14 ± .5 V DC regulated power supply.

b. Record dwell angle and open-circuit output voltage at 300 and 500 distributor rpm and at 500 rpm intervals up to the maximum speed of the intended application.

c. Insert the replacement part in the test system and repeat the observations per b above under identical test conditions.

d. The data observed with the replacement part in the system must meet the following criteria:

(1) The dwell angle change: Not to exceed that of the original equipment by more than ± 2° at all measured rpm intervals.

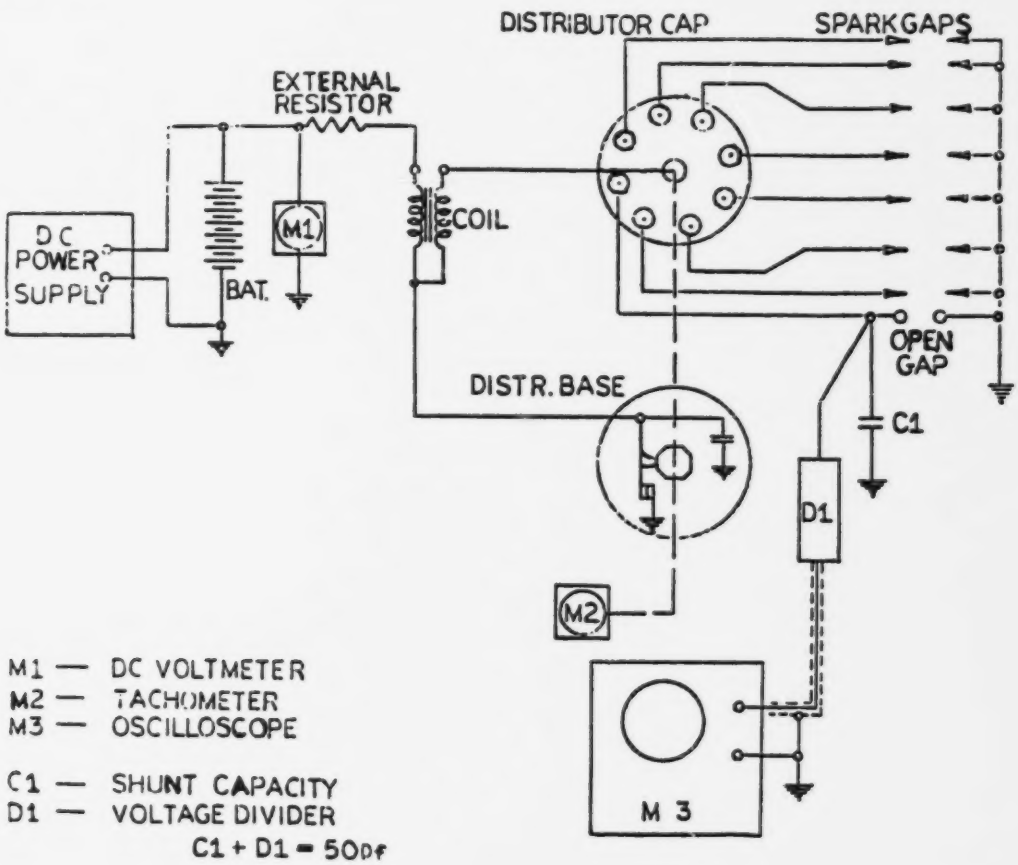


FIGURE 1

(2) The open circuit output voltage (M-3): Not less than 90% of the OE breaker point assembly at any measured rpm.

e. Repeat step c above at −40°C (−40°F) and 100°C (212°F).

f. The breaker points shall operate without evidence of point bounce at all test speeds and temperatures and shall operate easily without binding when operated manually.

2. *Durability Procedures*

a. Set up a bench ignition system using an applicable distributor or electro-mechanical equivalent.

b. Install the breaker point assembly under test in the distributor, lubricate and adjust per applicable vehicle manufacturer's specifications. Use applicable coil, primary resistor, capacitor, cap and rotor.

c. Connect the primary of the test system with a power supply regulated at 14±0.5 V DC for a 12V system.

d. The secondary portion of the test system is to be connected to a 12±2KV spark gap.

e. An external heat source shall generate an ambient temperature of 70° (158°F) for the distributor.

f. Drive the distributor at 1750±50 rpm for 200 hours. After each 50 hour interval, run the distributor for 5 minutes with one open circuit spark gap instead of a 12KV gap.

g. The replacement breaker point assembly must have the capability of performing throughout the duration of the test without evidence of any failure resulting in loss of spark in the 12KV spark gap.

h. After the 200 hours repeat step 1.c. above. The open circuit output voltage must be at least 90% of that measured in 1.c.

F. Capacitors/Condensers

1. *Test Procedures and Criteria*

a. The electrostatic capacitance of the replacement condenser shall be within ±20% of the value of the original part at 20±3°C (68±5°F). The capacitance is to be measured on a capacitance bridge having an accuracy of ±1% at 1 KHz frequency.

b. Set up the test system in accordance with Figure 1. The condenser series resistance shall be such that the output voltage at 500 distributor rpm with the replacement condenser shall not be less than 90% of the output voltage (M-3) with the original equipment condenser.

c. The capacitor must be able to withstand a minimum test voltage of 500V DC for a minimum of 0.1 seconds without failure.

d. (1) Measure capacitance after 4 hours minimum soak at 70° (158°F).

(2) After one hour at room temperature, place capacitor at −18°C (0°F) for 4 hours minimum and measure capacitance.

(3) Place capacitor at room temperature for 4 hours minimum and measure capacitance.

e. After thermal cycling, repeat 1.a. and b. The results must be within ±10 percent of the intital measurements.

2. *Durability Procedure*

a. Set up a bench ignition system using an applicable distributor or an electro-mechanical equivalent.

b. Install the capacitor under test in the distributor adjusted to applicable vehicle manufacturer's specifications. Use applicable coil, primary resistor, breaker points, cap and rotor.

c. Connect the primary of the test system with a power supply regulated at 14±0.5V DC for 12V system.

d. The secondary portion of the test system is to be connected to a 12±2KV spark gap.

e. An external heat source shall generate an ambient temperature of 70°C (158°F) for the distributor.

f. Drive the distributor at 1750±50 rpm for 200 hours. After each 50 hour interval, run the distributor for 5 minutes with one open circuit spark gap instead of a 12KV gap.

g. The replacement part must have the capability of performing throughout the duration of the test without evidence of any failure resulting in loss of spark in the 12KV spark gap.

h. After the 200 hours, the condenser shall be within 10 percent of the capacitance and voltage measured in 1.a. and b. respectively.

G. Distributor Caps and/or Rotors

1. *Test Procedures and Criteria*

a. Set up test system in accordance with the circuit and equipment per Figure 1 with OE distributor cap and/or rotor. Connect the primary to a 14±.5V DC regulated power supply.

b. Record open circuit output voltage (M-3) at 300 and 500 distributor rpm and at intervals of 500 distributor rpm up to the maximum speed of the intended application.

c. Insert the intended replacement part(s) in the system and repeat step b. above under identical test conditions.

d. Subject the intended replacement part to the following thermal sequence through five complete cycles:

1. 12 hours at −40°C (−40°F)
2. 2 hours at room temperature
3. 4 hours at 100°C (212°F)
4. 2 hours at room temperature.

e. Repeat step b. above with the replacement part(s).

f. The output voltages measured with the replacement part(s) in the system must be at least 90% of the output voltage with the OE cap and/or rotor.

2. *Durability Procedures*

a. Set up test system in accordance with circuit and equipment per Figure 1.

b. Install the cap and/or rotor under test in distributor, lubricate and adjust per applicable vehicle manufacturer's specifications. Use equivalent coil, primary resistor, breaker points and capacitor.

c. Connect the primary of the test system with a power supply regulated at 14±0.5 V D.C.

1. In breaker point operated systems, connect secondary to a 12 KV±2 KV gap.

2. In electronic ignition systems, connect secondary to a gap equivalent to at least 50% of peak open-circuit voltage.

d. An external heat source shall generate an ambient temperature of 70° (158° F) for the distributor.

e. Distributor shall be driven at 1750±50 rpm for 200 hours. After each 50 hours interval, run the distributor for 5 minutes with one open-circuit spark gap instead of a 12KV gap.

f. The replacement part(s) must have the capability of performing throughout the duration of the test without evidence of any failure resulting in loss of spark at the spark gap.

g. Repeat step 1.c. above. The open circuit output voltage must be at least 90% of that measured in step 1.c.

h. The replacement cap and/or rotor must be free of any visual cracks, arcing or melting.

H. Spark Plugs

1. *Test Procedures and Criteria*

a. Heat rating: When comparatively rated in the SAE 17.6 Spark Plug Rating engine according to the SAE J549A Recommended Practice, the comparative average rating of at least five (5) replacement spark plugs shall be within 15 percent of the average IMEP of at least five (5) OE spark plugs.

b. Gap spacing: The electrode spark gap shall be equivalent or adjustable to the recommended gap for the original equipment spark plug.

c. Gap location: The electrode gap position in the chamber shall be the same as specified by the vehicle manufacturer.

d. Flashover: The spark plug terminal end, with the properly fitted connecting boot, shall not flash-over at peak anticipated voltage for the intended application when electrode gap is 15% larger than vehicle manufacturer's gap specifications.

I. Inductive System Coils

1. *Test Procedures and Criteria*

a. Set up the circuit in accordance with Figure 1. Operate the circuit by an applicable distributor or equivalent triggering device and applicable primarly resistor with a 50 pf load at 14.0±0.50 volts DC input as applicable and stabilized at an ambient temperature of 20°C±3°C (68°F±5°F).

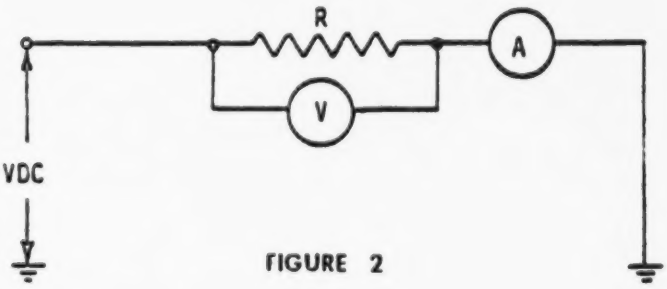
b. With the original equipment coil installed, record the predominant minimum peak voltage and rise time at 300 and 500 distributor rpm, and at 500 rpm intervals up to the maximum intended operating speed. The measurement is to be taken after 4 minutes operation at each speed.

c. Install the replacement coil to be tested and repeat step b. above.

d. The replacement coil shall have an open-circuit output voltage (M-3) at least 90% of the OE coil output voltage and a rise time not to exceed 110% of original equipment coil at each distributor test speed.

2. *Durability Procedure*

a. Install the replacement ignition coil in the ignition system using the applicable rotor, cap, capacitor, breaker points, and primary resistor.



Current A to be maintained at 2.5 amps for duration of test.

FIGURE 2

b. Operate the circuit with a regulated power supply of 14.0 ± .5 volts DC connected to the primary at an ambient temperature of 70°C (158°F) at 1750 ± 50 distributor rpm for a duration of 200 hours. After each 50 hour interval, run the distributor for 5 minutes with one open-circuit spark gap instead of a 12KV gap.

c. The ignition coil shall perform throughout the test without any evidence of coil failure which would result in the loss of the spark in the 12 KV spark gap.

d. Repeat Step 1.c. above. The open-circuit output voltage must be at least 90% of that measured in 1.c.

J. PRIMARY RESISTORS

1. *Test Procedures and Criteria.*

a. Configure the circuit shown in Figure 2, using the original equipment resistor.

b. At 20 ± 3°C (68 ± 5°F), apply voltage for 15 minutes; maintain current at 2.5 amps. At conclusion of 15 minutes, read voltage and current. Calculate resistance using the relationship

$R = E/I$,

where:
R = Resistance in ohms,
E = Voltage (V) in volts,
I = Current (A) in amps.

c. Replace OE test sample with part to be certified and repeat step b. above.

d. Resistance of the part shall be within ± 20% of original equipment resistance.

2. *Durability Procedure.*

a. Using the circuit shown in Figure 1, apply current at 70°C (150°F), for 200 hours.

b. After 200 hours retest as in step 1.c. above, and verify that resistance is within ± 20% of the value as measured in step 1.b. above.

K. DISTRIBUTORS—BREAKER POINT

1. *Test Procedures and Criteria.*

a. Using an appropriate test installation, operate the distributor through its intended speed range.

b. The advance mechanism shall function within the tolerance of the vehicle manufacturer's original specification over the speed range of the intended application as to vacuum and centrifugal advance.

c. The advance mechanism shall repeatedly return to the zero setting ± 0.5 distributor degrees after advancing and retarding through the operating range.

d. The distributor firing angle accuracy shall remain within the originally specified tolerances throughout the speed range of the intended application.

e. The distributor shall be capable of maintaining the dwell angle of the original equipment specification with ±2 degrees throughout the speed range of the intended application.

f. The distributor shall be capable of open-circuit output voltage (M-3) equal to at leat 90 percent of the voltage produced by the original equipment system over the speed range of the intended application.

2. *Durability Procedure.*

a. At an ambient temperature of 70° C (150° F), operate the distributor at 1750 ± 50 rpm for 200 hours.

b. The distributor must meet the requirements of paragraph 1.b. through f. after the 200 hours.

L. RESERVE FOR ENGINE VALVES

M. RESERVED FOR CAMSHAFTS

N. RESERVED FOR PISTONS

O. OXIDIZING CATALYTIC CONVERTERS

1. *Test Procedures and Criteria.*

(a) The fresh and aged conversion efficiencies of the replacement oxidizing catalytic converter shall be equal to or exceed those of the original equipment converter for CO and HC emissions. The fresh and aged Light-off Time (LOT) of the replacement converter shall be equal to or less than those of the original equipment converter for CO and HC emissions. These parameters shall be determined for both fresh and aged converters under the same conditions using the following steady state feed gas concentrations and conditions for LOT and Conversion Efficiency respectively:

	LOT	Conversion efficiency
Exhaust mass flow rate.	See note (2).....	See note (1).
Total hydrocarbons.	See note (3).....	See note (3).
Carbon monoxide....	1.0 to 2.5%.....	1.0 to 2.5%.
Hydrogen.....	0.33 × % CO maximum.	0.33 × % CO maximum.
Oxygen.....	1.5 × % CO minimum.	1.5 × % CO minimum.
Converter inlet gas temperature.	650°F to 850°F.....	650°F to 850°F.

NOTE 1: Not less than peak air flow of the vehicle or engine configuration being certified for. If more than one vehicle or engine application is to be covered by a generic converter, the greatest peak vehicle or engine air flow shall be used.

NOTE 2: Between 0.10 and 0.40 times the value determined in Note 1.

NOTE 3: 500–2000 parts per million by volume minimum based on Methane calibration. If a non-engine simulator gas source is used, a mixture ratio of 10% propane to 90% propylene by volume will constitute an acceptable synthetic for total exhaust hydrocarbons.

(i) LOT tests shall be conducted by exposing the converter to a step change in temperature, from ambient to that specified above: 650°–850°F. Converter inlet and outlet exhaust emissions as measured. Light-off Time is then determined by recording the time required for the converter to reduce the outlet emissions (HC and CO) to 50% of the inlet emissions, on a volumetric concentration basis, measured from the step temperature change.

(ii) Conversion efficiency measurements shall be obtained by passing stabilized-feed

gas through the converter (at conditions specified above) and making simultaneous measurements of inlet and outlet emission volume concentrations. The conversion efficiency for CO and HC is then calculated.

(iii) The particular conditions for which LOT and conversion efficiency are measured (i.e., exhaust mass flow rate, total hydrocarbons, carbon monoxide, hydrogen, oxygen, and converter inlet temperature) for the replacement converter and original equipment converter tests must not vary from one another by more than 10%.

(b) Fresh and aged catalytic converters may be obtained by operating the converter on individual vehicle or engine application for which it is intended on the Federal Test Procedure road durability driving cycle. A fresh converter results when the converter has operated between 2000 and 5000 miles or equivalent hours. An aged converter results when the converter has been operated for the warranted life of the original equipment converter.

(c) Where one generic converter is intended to cover multiple vehicle or engine configurations, converter aging may be obtained per Paragraph (b) above, on a vehicle or engine which represents the greatest peak air flow of the group of vehicle configurations to be covered, and whose calibration and feed gas concentrations are representative of the vehicle or engine configurations being certified for.

2. *Other Considerations.*

(a) Replacement converter must fit within the width and length space envelope of the original equipment converter. Converter spacing from the underbody and for ground clearance must be the same or greater than the original equipment converter application.

(b) Pressure drop measured between inlet and outlet pipe interconnecting points on the replacement converter shall be within ±25% of similar measurements for the original equipment converter being replaced, when measured at each of three flow conditions 50 SCFM, 100 SCFM, and 150 SCFM with a suitable fluid medium such as air. Maximum allowable exhaust gas leakage from the replacement coverter shall be 0.4 cubic feet per minute measured at 4.0 pounds per square inch differential. All measurements must be normalized to equal density conditions.

(c) Converter skin temperature shall be measured during the converter efficiency test. The skin temperature for the replacement converter must equal or be less than that for the original equipment converter.

P. Air Cleaner Filter Element

1. *Test Procedures and Criteria.*

(a) Using test equipment and procedures specified in SAE-J726c, perform:

(i) Air Flow and Pressure Drop Test (2.3) at 200 SCFM, record test conditions and pressure drop.

(ii) Efficiency Test (2.4) to measure full life efficiency at 200 SCFM to a total pressure drop of 9 inches of water, record test conditions and test duration from first to last addition of standard dust, weigh test element and absolute filter at end of test using three randomly selected original equipment air filter elements.

(b) Perform tests as in (a) above, under conditions controlled to within ±10% of the corresponding original equipment test conditions, for three randomly selected replacement air filter elements.

(c) The replacement air filter element average recorded test results. The pressure drop in (i) and absolute filter weight in (ii) must be equal to or less than those average results for the original equipment test results. The replacement air filter averaged test results for element weight in (ii) must be equal to or larger than averaged result for the original equipment averaged test results.

2. *Durability Procedure.*

(a) After use in the intended vehicle or engine application for the recommended service interval, the replacement element shall evidence an increase in pressure drop (as measured in 1 (a)(i) above) equal to or less than that of the original equipment air filter element tested in the identical manner.

[45 FR 78464, Nov. 25, 1980]

Subpart W—Emission Control System Performance Warranty Short Tests

Authority: Sec. 207, 301(a), Clean Air Act as amended (42 U.S.C. 7545 and 7601(a)).

Source: 45 FR 34806, May 22, 1980, unless otherwise noted.

§ 85.2201 Applicability.

This subpart contains the short test and standards to be employed in conjunction with the Emission Performance Warranty, Subpart V.

§ 85.2202 General provisions.

The definitions and abbreviations in Subpart A of Part 86 of this chapter apply to this subpart.

§ 85.2203-81 Short test standards for 1981 and later model year light-duty vehicles.

(a) For 1981 and later model year light duty vehicles at low altitude, and

for 1982 and later model year light duty vehicles at high altitude to which high altitude certification standards of 1.5 g/mile HC and 15 g/mile or less apply, short test emissions shall not exceed.

(1) Idle test.

(i) *Hydrocarbons:* 220 ppm as hexane.

(ii) *Carbon monoxide:* 1.2%.

(2) Two speed idle test, idle mode. The lowest readings from the two idle modes shall be used to determine compliance.

(i) *Hydrocarbons:* 200 ppm as hexane.

(ii) *Carbon monoxide:* 1.0%.

(3) Two speed idle test, high speed mode.

(i) *Hydrocarbons:* 200 ppm as hexane.

(ii) *Carbon monoxide:* 1.0%.

(4) Loaded test, idle mode.

(i) *Hydrocarbons:* 220 ppm as hexane.

(ii) *Carbon monoxide:* 1.2%.

(5) Loaded test, low speed mode.

(i) *Hydrocarbons:* 220 ppm as hexane.

(ii) *Carbon monoxide:* 1.2%.

§ 85.2204-81 Short test standards for 1981 and later model year light-duty trucks.

(a) For 1981 and later model year light duty trucks at low altitude, and for 1982 and later model year light duty trucks at high altitude to which high altitude certification standards of 2.0 g/mile HC and 26. g/mile CO or less apply, short test emissions shall not exceed:

(1) Idle test.

(i) *Hydrocarbons:* 220 ppm as hexane.

(ii) *Carbon monoxide:* 1.2%.

(2) Two speed idle test, idle mode. The lowest readings from the two idle modes shall be used to determine compliance.

(i) *Hydrocarbons:* 200 ppm as hexane.

(ii) *Carbon monoxide:* 1.0%.

(3) Two speed idle test, high speed mode.

(i) *Hydrocarbons:* 200 ppm as hexane.

(ii) *Carbon monoxide:* 1.0%.

(4) Loaded test, idle mode.

(i) *Hydrocarbons:* 220 ppm as hexane.

(ii) *Carbon monoxide:* 1.2%.

(5) Loaded test, low speed mode.

(i) *Hydrocarbons:* 220 ppm as hexane.

(ii) *Carbon monoxide:* 1.2%.

§§ 85.2205—85.2210 [Reserved]

§ 85.2211 Alternative standards and procedures.

(a) As a part of the certification process, as set forth in § 86.078 et seq., a manufacturer may request an alternative short test standard or short test procedure for any vehicle or engine for which the standards or procedures specified in this subpart are not appropriate. The manufacturer shall supply relevant test data and technical support to substantiate his claim and shall also recommend alternative test procedures and/or standards for the Administrator's consideration. Upon an acceptable showing that the general standards or procedures are not appropriate, the Administrator shall set through rulemaking procedures alternative standards or procedures. The administrative provisions of the certification process (see § 86.078 et seq.), apply to such a request for alternative standards or procedures.

(b) Any such alternative standard or test procedure must be specified on the emission control information label to be effective for that particular vehicle or engine.

§ 85.2212 Idle test.

(a) *General requirements:* Vehicles shall be tested in as-received condition. Engines shall be at normal operating temperature and not overheating (as indicated by gauge warning light or boiling radiator) with all accessories off.

(b) *Test Sequence.* (1) Analyzers shall be warmed-up, in stabilized operating conditions and adjusted as required in § 85.2217.

(2) Optional: The engine may be preconditioned by operating it at 2500± 300 rpm for up to 30 seconds.

(3) With engine idling and transmission in neutral, the sample probe shall be inserted into the tailpipe. Record exhaust concentrations after stabilized

readings are obtained or at the end of 30 seconds, whichever occurs first. This process shall be repeated as necessary for multiple exhaust pipes. However, multiple readings are not necessary for exhaust originating from a common point.

(4) Results from multiple exhaust pipes shall be numerically averaged.

§ 85.2213 Two speed idle test.

(a) *General requirements:* Vehicles shall be tested in as-received condition. Engines shall be at normal operating temperature and not overheating (as indicated by gauge warning light or boiling radiator) with all accessories off.

(b) *Test Sequence.* (1) Analyzers shall be warmed-up, in stabilized operating conditions and adjusted as required in § 85.2217.

(2) Attach tachometer pick up.

(3) With engine idling and transmission in neutral, the sample probe shall be inserted into the tailpipe. Record exhaust concentrations after stabilized readings are obtained or at the end of 30 seconds, whichever occurs first. This process shall be repeated as necessary for multiple exhaust pipes. However, multiple readings are not necessary for exhaust pipes originating from a common point.

(4) The engine speed shall be increased to 2500 ± 300 rpm, with transmission in neutral. Record exhaust concentrations after stabilized readings are obtained or at the end of 30 seconds, whichever occurs first. Repeat as in subparagraph (3) for multiple exhaust pipes, if necessary.

(5) The engine speed shall be reduced to free idle with transmission in neutral. Record exhaust concentrations after stabilized readings are obtained or at the end of 30 seconds, whichever occurs first. Repeat as specified in subparagraph (3) for multiple exhaust pipes, if necessary.

(6) For vehicles with multiple exhaust pipes, the separate results from each pipe for each mode (subparagraphs (3), (4), and (5) above) shall be numerically averaged for each pollutant.

(7) The idle mode final results shall be the lowest HC and lowest CO readings from steps (3) and (5).

(c) Exhaust concentration measurements from both the idle mode and the high speed mode are not required. The short test may be used to evaluate emissions from either mode alone or from both modes, the choice being made by the jurisdiction implementing the inspection program. If exhaust concentrations are not measured on a given mode, the vehicle shall be operated at the specified test condition for 15 to 30 seconds. The final idle mode, paragraph (b)(5) of this section, may be omitted if only high speed mode exhaust concentrations are to be measured or if the vehicle is below idle standards on the first measurement, paragraph (b)(3) of this section. The high speed mode and final idle mode may be omitted if only idle mode exhaust concentrations are to be measured and if the vehicle is below idle standards on the first measurement.

§ 85.2214 Loaded test.

(a) *General requirements.* Vehicles shall be tested in as-received condition. Engines shall be at normal operating temperature and not overheating (as indicated by gauge, warning light or boiling radiator) with all accessories off. An auxiliary cooling fan is optional.

(b) *Test Sequence.* (1) The dynamometer and analyzers shall be warmed-up, in stabilized operating conditions and adjusted as required in §§ 85.2216 and 85.2217.

(2) The vehicle shall be placed on the dynamometer.

(3) The sample probe shall be inserted into the tailpipe.

(4) Optional: A high speed mode, maximum 50 mph and 30 seconds duration, is permitted if vehicle overheating does not occur.

(5) Drive for automatic or 3rd gear for manual transmissions shall be used. The vehicle shall be operated at 30 ± 1 mph roll speed while measuring exhaust HC and CO. Record exhaust concentrations after stabilized readings are obtained or at the end of 30 seconds, whichever occurs first. This process shall be repeated as necessary for multiple exhaust pipes. However, multiple readings are not necessary

for exhaust pipes originating from a common point.

(6) The vehicle shall be idled in neutral. Record exhaust concentrations after stabilized readings are obtained or at the end of 30 seconds, whichever occurs first. Repeat as specified in subparagraph (5) of this paragraph for multiple exhaust pipes, if necessary.

(7) For vehicles with multiple exhaust pipes, the separate results from each pipe for each mode (subparagraphs (5) and (6) of this paragraph) shall be numerically averaged for each pollutant.

(c) Exhaust concentration measurements from both the loaded mode and the idle mode are not required. The short test may be used to evaluate emissions from either mode alone or from both modes, the choice being made by the jurisdiction implementing the inspection program. If exhaust concentrations are not measured on the loaded mode the vehicle shall be operated at the specified test condition for 15 to 30 seconds. If idle exhaust concentrations are not measured, the idle mode may be omitted.

§ 85.2215 Exhaust sampling system.

(a) The exhaust sampling system shall consist of a sample probe, moisture separator and analyzers for HC and CO.

(b)(1) The HC analyzer shall have an accuracy of ± 15 ppm at 200 to 220 ppm concentration HC (as hexane); the CO analyzer shall have an accuracy of ± 0.10% CO from 1.0% to 1.2% concentration.

(2) Response time of the analyzers shall be 15 seconds to 95% of the final reading.

(3) Analyzer drift (up-scale and down-scale zero and span wander) shall not exceed ± 0.1% CO and ± 15 ppm HC (as hexane) on the lowest range capable of reading 1.0% CO or 200 ppm HC (as hexane) during a one-hour period.

§ 85.2216 Dynamometer.

(a) The loaded test dynamometer shall be adjusted to produce a load of 9.0 ± 1.0 hp at 30 mph.

(b) Speed shall be measured from the dynamometer roll(s) with an accuracy of ± 1.5 mph at 30 mph true roll speed.

§ 85.2217 Calibrations, adjustments.

(a) Equipment shall be calibrated in accordance with the manufacturers' instructions.

(b) Within one hour prior to a test, the analyzers shall be zeroed and spanned. Ambient air is acceptable as a zero gas; an electrical span check is acceptable. Zero and span checks shall be made on the lowest range capable of reading the short test standard.

(c) Within eight hours prior to a loaded test, the dynamometer shall be checked for proper power absorber settings.

(d)(1) The analyzers shall have been spanned and adjusted, if necessary, using gas traceable to NBS standards ± 2% within one week of the test. These span gases shall have concentrations either:

(i) Between the standards specified in this subpart and the jurisdictions inspection standards for 1981 model year light duty vehicles, or

(ii) Be within −50% to +100% of the standards in this subpart.

(2) For analyzers with a separate calibration or span port, CO readings using calibration gas through the probe and through the calibration port shall be made; discrepancies of over 3% shall require repair of leaks. No analyzer adjustments shall be permitted during this check.

§ 85.2218 Test report.

(a) Upon failure of a short test, the vehicle's operator or owner shall be furnished with a test report containing:

(1) Vehicle description, including either license plate or manufacturer's identification number, and odometer reading.

(2) Date of test.

(3) Name of individual or organization performing the test and location thereof.

(4) Type of short test performed.

(5) Test results, exhaust concentrations for each mode measured.

(b) The test report shall certify that the short test was performed in accordance with these regulations and it

shall be signed by an individual who either performed the test or has actual knowledge of the performance of the test.

(c) For purposes of this section, "failure of a short test" means that the vehicle exceeded the standards in this subpart or the Inspection/Maintenance standards of the jurisdiction, whichever is less stringent.

Appendix I-Appendix VII—[Reserved]

Appendix VIII—Vehicle and Engine Parameters and Specifications

A. LIGHT DUTY VEHICLE PARAMETERS AND SPECIFICATIONS

I. Basic Engine Parameters-Reciprocating Engines.
1. Compression ratio.
2. Cranking compression pressure.
3. Valves (intake and exhaust).
a. Head diameter dimension.
b. Valve lifter or actuator type and valve lash dimension.
4. Camshaft timing.
a. Valve opening (degrees BTDC).
b. Valve closing (degrees ATDC).
c. Valve overlap (inch-degrees).
II. Basic Engine Parameters—Rotary Engines.
1. Intake port(s).
a. Timing and overlap if exposed to the combustion chamber.
2. Exhaust port(s).
a. Timing and overlap if exposed to the combustion chamber.
3. Cranking compression pressure.
4. Compression ratio.
III. Air Inlet System.
1. Temperature control system calibration.
IV. Fuel System.
1. General.
a. Engine idle speed.
b. Engine idle mixture.
2. Carburetion.
a. Air-fuel flow calibration.
b. Transient enrichment system calibration.
c. Starting enrichment system calibration.
d. Altitude compensation system calibration.
e. Hot idle compensation system calibration.
3. Fuel injection.
a. Control parameters and calibration.
b. Fuel shutoff system calibration.
c. Starting enrichment system calibration.
d. Transient enrichment system calibration.
e. Air-fuel flow calibration.
f. Altitude compensation system calibration.
g. Operating pressure(s).
h. Injector timing calibrations.
V. Injection System.
1. Control parameters and calibration.
2. Initial timing setting.
3. Dwell setting.
4. Altitude compensation system calibration.
5. Spark plug voltage.
VI. Engine Cooling System.
1. Thermostat calibration.
VII. Exhaust Emission Control System.
1. Air injection system.
a. Control parameters and calibrations.
b. Pump flow rate.
2. EGR system.
a. Control parameters and calibrations.
b. EGR valve flow calibration.
3. Catalytic converter system.
a. Active surface area.
b. Volume of catalyst.
c. Conversion efficiency.
4. Backpressure.
VIII. Evaporative Emission Control System.
1. Control parameters and calibrations.
2. Fuel tank.
a. Pressure and vacuum relief settings.
IX. Crankcase Emission Control System.
1. Control parameters and calibrations.
2. Valve calibration.
X. Auxiliary Emission Control Devices (AECD).
1. Control parameters and calibrations.
2. Component calibration(s).
XI. Emission Control Related Warning Systems.
1. Control parameters and calibrations.
2. Component calibrations.
XII. Driveline Parameters.
1. Axle ratio(s).

B. HEAVY DUTY GASOLINE ENGINE PARAMETERS AND SPECIFICATIONS

I. Basic Engine Parameters.
1. Compression ratio.
2. Cranking compression pressure.
3. Supercharger/turbocharger calibration.
4. Valves (intake and exhaust).
a. Head diameter dimension.
b. Valve lifter or actuator type and valve lash dimension.
5. Camshaft timing.
a. Valve opening (degrees BTDC).
b. Valve closing (degrees ATDC).
c. Valve overlap (inch-degrees).
II. Air Inlet System.
1. Temperature control system calibration.
III. Fuel System.
1. General.
a. Engine idle speed.
b. Engine idle mixture.
2. Carburetion.
a. Air-fuel flow calibration.

b. Transient enrichment system calibration.
c. Starting enrichment system calibration.
d. Altitude compensation system calibration.
e. Hot idle compensation system calibration.
3. Fuel injection.
a. Control parameters and calibrations.
b. Fuel shutoff system calibration.
c. Starting enrichment system calibration.
d. Transient enrichment system calibration.
e. Air-fuel flow calibration.
f. Altitude compensation system calibration.
g. Operating pressure(s).
h. Injector timing calibration.
IV. Ignition System.
1. Control parameters and calibration.
2. Initial timing setting.
3. Dwell setting.
4. Altitude compensation system calibration.
5. Spark plug voltage.
V. Engine Cooling System.
1. Thermostat calibration.
VI. Exhaust Emission Control System.
1. Air injection system.
a. Control parameters and calibrations.
b. Pump flow rate.
2. EGR system.
a. Control parameters and calibrations.
b. EGR valve flow calibration.
3. Catalytic converter system.
a. Active surface area.
b. Volume of catalyst.
c. Conversion efficiency.
4. Backpressure.
VII. Evaporative Emission Control System.
1. Control parameters and calibrations.
2. Fuel tank.
a. Pressure and vacuum relief settings.
VIII. Crankcase Emission Control System.
1. Control parameters and calibrations.
2. Valve calibrations.
IX. Auxiliary Emission Control Devices (AECD).
1. Control parameters and calibrations.
2. Component calibrations.
X. Emission Control Related Warning Systems.
1. Control parameters and calibrations.
2. Component calibrations.

C. HEAVY DUTY DIESEL ENGINE PARAMETERS AND SPECIFICATIONS

I. Basic Engine Parameters-Four Stroke Cycle Reciprocating Engines.
1. Compression ratio.
2. Cranking compression pressure.
3. Supercharger/turbocharger calibration.
4. Valves (intake and exhaust).
a. Head diameter dimension.
b. Valve lifter or actuator type and valve lash dimension.
5. Camshaft timing.
a. Valve opening (degrees BTDC).
b. Valve closing (degrees ATDC).
c. Valve overlap (inch-degrees).
II. Basic Engine Parameters—Two-Stroke Cycle Reciprocating Engine.
1.-5. Same as Section C.I.
6. Intake port(s).
a. Timing in combustion cycle.
7. Exhaust port(s).
a. Timing in combustion cycle.
III. Air Inlet System.
1. Temperature control system calibration.
2. Maximum allowable air inlet restriction.
IV. Fuel System.
1. Fuel injection.
a. Control parameters and calibrations.
b. Transient enrichment system calibration.
c. Air-fuel flow calibration.
d. Altitude compensation system calibration.
e. Operating pressure(s).
f. Injector timing calibration.
V. Exhaust Emission Control System.
1. Maximum allowable backpressure.
VI. Crankcase Emission Control System.
1. Control parameters and calibrations.
2. Valve calibrations.
VII. Auxiliary Emission Control Devices (AECD).
1. Control parameters and calibrations.
2. Component calibration(s).

[42 FR 28129, June 2, 1977]

PART 86—CONTROL OF AIR POLLUTION FROM NEW MOTOR VEHICLES AND NEW MOTOR VEHICLE ENGINES: CERTIFICATION AND TEST PROCEDURES

Subpart A—General Provisions for Emission Regulations for 1977 and Later Model Year New Light-Duty Vehicles, 1977 and Later Model Year New Light-Duty Trucks, and for 1977 and Later Model Year New Heavy-Duty Engines

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AUTHORITY: Secs. 202, 206 and 301(a)(1) of the Clean Air Act as amended (42 U.S.C. 7521, 7524 and 7601(a)(1)).

Subpart A—General Provisions for Emission Regulations for 1977 and Later Model Year New Light-Duty Vehicles, 1977 and Later Model Year New Light-Duty Trucks, and for 1977 and Later Model Year New Heavy-Duty Engines

SOURCE: 42 FR 32907, June 28, 1977, unless otherwise noted.

§ 86.078-3 Abbreviations.

(a) The abbreviations in this section apply to this subpart and also to Subparts B, D, H, I, J, N, O and P of this part and have the following meanings:

accel.—acceleration.
AECD—Auxiliary emission control device.
API—American Petroleum Institute.
ASTM—American Society for Testing and Materials.
BHP—Brake horsepower.
BSCO—Brake specific carbon monoxide.
BSHC—Brake specific hydrocarbons.
BSNO$_x$—Brake specific oxides of nitrogen.
C—Celsius.
cfh—cubic feet per hour.
CFV—Critical flow venturi.
CFV-CVS—Critical flow venturi—constant volume sampler.
CL—Chemiluminescence.
CO_2—carbon dioxide.
CO—Carbon monoxide.
conc.—concentration.
cfm—cubic feet per minute.
CT—Closed throttle.
cu. in.—cubic inch(es).
CVS—Constant volume sampler.
decel.—deceleration.
EP—End point.
evap.—evaporative.
F—Fahrenheit.
FID—Flame ionization detector.
FL—Full load.
ft.—feet.
g—gram(s).
gal.—U.S. gallon(s).
GVW—Gross vehicle weight.
GVWR—Gross vehicle weight rating.
h—hour(s).
H_2O—water.
HC—hydrocarbon(s).
HFID—Heated flame ionization detector.
Hg—mercury.
hi—high.
hp.—horsepower.
IBP—Initial boiling point.
ID—Internal diameter.
in.—inch(es).
K—kelvin.
kg—kilogram(s).
km—kilometer(s).
kPa—kilopascal(s).

lb.—pound(s).
lb.-ft.—pound-feet.
m—meter(s).
max.—maximum.
mg—milligram(s).
mi.—mile(s).
min.—minute(s).
ml—milliliter(s).
mm—millimeter(s).
mph—miles per hour.
mv—millivolt(s).
N_2—nitrogen.
NDIR—Nondispersive infrared.
NO—nitric oxide.
NO_2—nitrogen dioxide.
NO_x—oxides of nitrogen.
No.—Number.
O_2—oxygen.
Pb—lead.
pct.—percent.
PDP-CVS—Positive displacement pump—constant volume sampler.
ppm—parts per million by volume.
ppm C—parts per million, carbon.
psi—pounds per square inch.
psig—pounds per square inch gauge.
PTA—Part throttle acceleration.
PTD—Part throttle deceleration.
R—Rankin.
rpm—revolutions per minute.
RVP—Reid vapor pressure.
s—second(s).
SAE—Society of Automotive Engineers.
SI—International system of units.
sp.—speed.
TEL—Tetraethyl lead.
TML—Tetramethyl lead.
UDDS—Urban dynamometer driving schedule.
V—volt(s).
vs—versus.
W—watt(s).
WF—Weighting factor.
WOT—Wide open throttle.
wt.—weight.
'—feet.
"—inch(es).
°—degree(s).
Σ—summation.

[42 FR 32907, June 28, 1977, as amended at 45 FR 4149, Jan. 21, 1980]

§ 86.078-4 Section numbering; construction.

(a) *Section numbering.* The model year of initial applicability is indicated by the last two digits of the 5 digit group. A section remains in effect for subsequent years until it is superseded. The number following the hyphen designates what previous section is replaced by a future regulation.

EXAMPLES: Section 86.077-6 applies to the 1977 and subsequent model years until superseded. If a § 86.080-6 is promulgated, it would take effect with the 1980 model year; § 86.077-6 would not apply after the 1979 model year. Section 86.077-10 would be replaced by § 86.078-10 beginning with the 1978 model year.

(b) *Construction.* Except where indicated, the language in this subpart applies to both vehicles and engines. In many instances language referring to engines is enclosed in parentheses and immediately follows the language discussing vehicles.

§ 86.078-6 Hearings on certification.

(a)(1) After granting a request for a hearing under §§ 86.078-22 or 86.078-30 the Administrator will designate a Presiding Officer for the hearing.

(2) The General Counsel will represent the Environmental Protection Agency in any hearing under this section.

(3) If a time and place for the hearing has not been fixed by the Administrator under §§ 86.078-22 or 86.078-30, the hearing shall be held as soon as practicable at a time and place fixed by the Administrator or by the Presiding Officer.

(4) In the case of any hearing requested pursuant to § 86.078-30(c)(5)(i), the Administrator may in his discretion direct that all argument and presentation of evidence be concluded within such fixed period not less than 30 days as he may establish from the date that the first written offer of a hearing is made to the manufacturer. To expedite proceedings, the Administrator may direct that the decision of the Presiding Officer (who may, but need not be the Administrator himself) shall be the final EPA decision.

(b)(1) Upon his appointment pursuant to paragraph (a) of this section, the Presiding Officer will establish a hearing file. The file shall consist of the notice issued by the Administrator under §§ 86.078-22 or 86.078-30 together with any accompanying material, the request for a hearing and the supporting data submitted therewith, and all documents relating to the request for certification and all documents submitted therewith, and correspondence and other data material to the hearing.

(2) The hearing file will be available for inspection by the applicant at the office of the Presiding Officer.

(c) An applicant may appear in person, or may be represented by counsel or by any other duly authorized representative.

(d)(1) The Presiding Officer upon the request of any party, or in his discretion, may arrange for a prehearing conference at a time and place specified by him to consider the following:

(i) Simplification of the issues;

(ii) Stipulations, admissions of fact, and the introduction of documents;

(iii) Limitation of the number of expert witnesses;

(iv) Possibility of agreement disposing of all or any of the issues in dispute;

(v) Such other matters as may aid in the disposition of the hearing, including such additional tests as may be agreed upon by the parties.

(2) The results of the conference shall be reduced to writing by the Presiding Officer and made part of the record.

(e)(1) Hearings shall be conducted by the Presiding Officer in an informal but orderly and expeditious manner. The parties may offer oral or written evidence, subject to the exclusion by the Presiding Officer of irrelevant, immaterial and repetitious evidence.

(2) Witnesses will not be required to testify under oath. However, the Presiding Officer shall call to the attention of witnesses that their statements may be subject to the provisions of title 18 U.S.C. 1001 which imposes penalties for knowingly making false statements or representations, or using false documents in any matter within the jurisdiction of any department or agency of the United States.

(3) Any witness may be examined or cross-examined by the Presiding Officer, the parties, or their representatives.

(4) Hearings shall be reported verbatim. Copies of transcripts of proceedings may be purchased by the applicant from the reporter.

(5) All written statements, charts, tabulations, and similar data offered in evidence at the hearings shall, upon a showing satisfactory to the Presiding Officer of their authenticity, relevancy, and materiality, be received in evidence and shall constitute a part of the record.

(6) Oral argument may be permitted in the discretion of the Presiding Officer and shall be reported as part of the record unless otherwise ordered by him.

(f)(1) The Presiding Officer shall make an initial decision which shall include written findings and conclusions and the reasons or basis therefor on all the material issues of fact, law, or discretion presented on the record. The findings, conclusions, and written decision shall be provided to the parties and made a part of the record. The initial decision shall become the decision of the Administrator without further proceedings unless there is an appeal to the Administrator or motion for review by the Administrator within 20 days of the date the initial decision was filed.

(2) On appeal from or review of the initial decision the Administrator shall have all the powers which he would have in making the initial decision including the discretion to require or allow briefs, oral argument, the taking of additional evidence or the remanding to the Presiding Officer for additional proceedings. The decision by the Administrator shall include written findings and conclusions and the reasons or basis therefor on all the material issues of fact, law, or discretion presented on the appeal or considered in the review.

§ 86.078–7 Maintenance of records; submittal of information; right of entry.

(a) The manufacturer of any new motor vehicle (or new motor vehicle engine) subject to any of the standards or procedures prescribed in this subpart shall establish, maintain and retain the following adequately organized and indexed records.

(1) *General records.* (i) The records required to be maintained by this paragraph shall consist of:

(A) Identification and description of all certification vehicles (or certification engines) for which testing is required under this subpart.

(B) A description of all emission control systems which are installed on or incorporated in each certification vehicle (or certification engine).

(C) A description of all procedures used to test each such certification vehicle (or certification engine).

(ii) A properly filed application for certification, following the format prescribed by the US EPA for the appropriate model year, fulfills each of the requirements of this paragraph (a)(1).

(2) *Individual records.* (i) A brief history of each motor vehicle (or motor vehicle engine) used for certification under this subpart in the form of a separate booklet or other document for each separate vehicle (or each separate engine) in which shall be recorded:

(A) In the case where a current production engine is modified for use in a certification vehicle (or as a certification engine), a description of the process by which the engine was selected and of the modifications made, giving specifically the place of modification and installation of the engine into the certification vehicle and the person(s) in charge of modification and installation, as applicable. In the case where the engine for a certification vehicle (or certification engine) is not derived from a current production engine, a general description of the build up of the engine (e.g., experimental heads were cast and machined according to supplied drawings, etc.) giving specifically the place of engine assembly and installation into a certification vehicle and the person(s) in charge of engine assembly and installation, as applicable. In both cases above, a description of the origin and selection process for the carburetor, distributor, fuel system components, fuel injection components, emission control system components, smoke exhaust emission control system components, and exhaust aftertreatment devices as applicable, shall be included. The required descriptions shall specify the steps taken to assure that the certification vehicle (or certification engine) with respect to its engine, drive train, fuel system, emission control system components, exhaust aftertreatment devices, smoke exhaust emission control system components, vehicle weight or any other devices or components, as applicable, that can reasonably be expected to influence exhaust or evaporative emissions, as applicable, will be representative of production vehicles (or engines) and that either all components and/or vehicle (or engine) construction processes, component inspection and selection techniques, and assembly techniques employed in constructing such vehicles (or engines) are reasonably likely to be implemented for production vehicles (or engines) or that they are as closely analogous as practicable to planned construction and assembly processes.

(B) A complete record of all emission tests performed under Subparts B, D, H, I, J, N, and P, as applicable (except tests performed by EPA directly), including all individual worksheets and/or other documentation relating to each such test, or exact copies thereof, the date, time, purpose, and location of each test, the number of miles accumulated on the vehicle (or the number of hours accumulated on the engine), when the tests began and ended, and the names of supervisory personnel responsible for the conduct of the tests.

(C) The date and times of each mileage (or service) accumulation run, listing both the mileage (or number of operating hours) accumulated and the name of each driver or each operator of the automatic mileage accumulation device (or dynamometer operator).

(D) If used, the record of any devices employed to record the speed and/or mileage in relationship to time of the test vehicle (or engine RPM, and/or horsepower and/or torque in relationship to engine operating time).

(E) A record and description of all maintenance and other servicing performed, giving the date and time of the maintenance or service, the reason for it, the person authorizing it, and the names of supervisory personnel responsible for the conduct of the maintenance or service. The description shall indicate whether or not EPA specifically consented to the work and, if EPA did not, shall list the provision of this part which authorizes its performance.

(F) A record and description of each test performed to diagnose engine or

emissions control system performance, giving the date and time of the test, the reason for it, the person authorizing it, and the names of supervisory personnel responsible for the conduct of the test.

(G) The dates and times that the vehicle (or engine) was idle in storage, and in transit or transport.

(H) A brief description of any significant events affecting the vehicle (or engine) during any time in the period covered by the history not described by an entry under one of the previous headings including such extraordinary events as vehicle accidents (or accidents involving the engine) or driver speeding citations or warnings (or dynamometer runaway).

(ii) Each such history shall be started on the date that the first of any of the selection or buildup activities in paragraph (a)(2)(i)(A) of this section occurred with respect to the certification vehicle (or engine), shall be updated each time the operational status of the vehicle (or engine) changes or additional work is done on it, and shall be kept in a designated location.

(3) All records required to be maintained under this subpart shall be retained by the manufacturer for a period of six (6) years after issuance of all certificates of conformity to which they relate. Records may be retained as hard copy or reduced to microfilm, punch cards, etc., depending on the record retention procedures of the manufacturer, *Provided*, That in every case all the information contained in the hard copy shall be retained.

(b) The manufacturer of any new motor vehicle (or new motor vehicle engine) subject to any of the standards prescribed in this subpart shall submit to the Administrator at the time of issuance by the manufacturer copies of all instructions or explanations regarding the use, repair, adjustment, maintenance, or testing of such vehicle (or engine) relevant to the control of crankcase, exhaust or evaporative emissions, as applicable, issued by the manufacturer for use by other manufacturers, assembly plants, distributors, dealers, and ultimate purchasers; *Provided*, That any material not translated into the English language need not be submitted unless specifically requested by the Administrator.

(c)(1) Any manufacturer who has applied for certification of a new motor vehicle (or new motor vehicle engine) subject to certification test under this subpart shall admit or cause to be admitted any EPA Enforcement Officer during operating hours on presentation of credentials to any of the following:

(i) Any facility where any such tests or any procedures or activities connected with such tests are or were performed.

(ii) Any facility where any new motor vehicle (or new motor vehicle engine) which is being, was, or is to be tested is present.

(iii) Any facility where any construction process or assembly process used in the modification or build up of such a vehicle (or engine) into a certification vehicle (or certification engine) is taking place or has taken place.

(iv) Any facility where any record or other document relating to any of the above is located.

(2) Upon admission to any facility referred to in paragraph (c)(1) of this section, any EPA Enforcement Officer shall be allowed:

(i) To inspect and monitor any part or aspect of such procedures, activities, and testing facilities, including, but not limited to, monitoring vehicle (or engine) preconditioning, emissions tests and mileage (or service) accumulation, maintenance, and vehicle soak and storage procedures (or engine storage procedures), and to verify correlation or calibration of test equipment;

(ii) To inspect and make copies of any such records, designs, or other documents; and

(iii) To inspect and/or photograph any part or aspect of any such certification vehicle (or certification engine) and any components to be used in the construction thereof.

(3) In order to allow the Administrator to determine whether or not production motor vehicles (or production motor vehicle engines) conform in all material respects to the design specifications which applied to those vehicles (or engines) described in the application for certification for which a cer-

tificate of conformity has been issued to standards prescribed under section 202 of the Act, any manufacturer shall admit any EPA Enforcement Officer on presentation of credentials to both:

(i) Any facility where any document, design, or procedure relating to the translation of the design and construction of engines and emission related components described in the application for certification or used for certification testing into production vehicles (or production engines) is located or carried on; and

(ii) Any facility where any motor vehicles (or motor vehicle engines) to be introduced into commerce are manufactured or assembled.

(4) On admission to any such facility referred to in paragraph (c)(3) of this section, any EPA Enforcement Officer shall be allowed:

(i) To inspect and monitor any aspects of such manufacture or assembly and other procedures;

(ii) To inspect and make copies of any such records, documents or designs; and

(iii) To inspect and photograph any part or aspect of any such new motor vehicles (or new motor vehicle engines) and any component used in the assembly thereof that are reasonably related to the purpose of his entry.

(5) Any EPA Enforcement Officer shall be furnished by those in charge of a facility being inspected with such reasonable assistance as he may request to help him discharge any function listed in this paragraph. Each applicant for or recipient of certification is required to cause those in charge of a facility operated for its benefit to furnish such reasonable assistance without charge to EPA whether or not the applicant controls the facility.

(6) The duty to admit or cause to be admitted any EPA Enforcement Officer applies whether or not the applicant owns or controls the facility in question and applies both to domestic and to foreign manufacturers and facilities. EPA will not attempt to make any inspections which it has been informed that local law forbids. However, if local law makes it impossible to do what is necessary to insure the accuracy of data generated at a facility, no informed judgment that a vehicle or engine is certifiable or is covered by a certificate can properly be based on those data. It is the responsibility of the manufacturer to locate its testing and manufacturing facilities in jurisdictions where this situation will not arise.

(7) For purposes of this paragraph:

(i) "Presentation of credentials" shall mean display of the document designating a person as an EPA Enforcement Officer.

(ii) Where vehicle, component, or engine storage areas or facilities are concerned, "operating hours" shall mean all times during which personnel other than custodial personnel are at work in the vicinity of the area or facility and have access to it.

(iii) Where facilities or areas other than those covered by paragraph (c)(7)(ii) of this section are concerned, "operating hours" shall mean all times during which an assembly line is in operation or all times during which testing, maintenance, mileage (or service) accumulation, production or compilation of records, or any other procedure or activity related to certification testing, to translation of designs from the test stage to the production stage, or to vehicle (or engine) manufacture or assembly is being carried out in a facility.

(iv) "Reasonable assistance" includes, but is not limited to, clerical, copying, interpretation and translation services, the making available on request of personnel of the facility being inspected during their working hours to inform the EPA Enforcement Officer of how the facility operates and to answer his questions, and the performance on request of emissions tests on any vehicle (or engine) which is being, has been, or will be used for certification testing. Such tests shall be nondestructive, but may require appropriate mileage (or service) accumulation. A manufacturer may be compelled to cause the personal appearance of any employee at such a facility before an EPA Enforcement Officer by written request for his appearance, signed by the Assistant Administrator for Enforcement, served on the manufacturer. Any such employee who has been instructed by the manufacturer to appear will be entitled to be accom-

panied, represented, and advised by counsel.

(v) Any entry without 24 hour prior written or oral notification to the affected manufacturer shall be authorized in writing by the Assistant Administrator for Enforcement.

[42 FR 32907, June 28, 1977, as amended at 45 FR 63747, Sept. 25, 1980]

§ 86.079-20 Incomplete vehicles, classification.

(a) An incomplete truck less than 8500 pounds gross vehicle weight rating shall be classified by the manufacturer as a light-duty truck or as a heavy-duty vehicle. Incomplete light-duty trucks shall be described in the manufacturer's application for certification. The frontal area and curb weight used for certification purposes shall be specified on the label required in § 86.079-35(d). Incomplete heavy-duty trucks must be labeled as required in § 86.079-35(e).

§ 86.079-27 Special test procedures.

(a) For light-duty vehicles and light-duty trucks the Administrator may, on the basis of a written application therefore by a manufacturer, prescribe test procedures, other than those set forth in this part, for any motor vehicle which he determines is not susceptible to satisfactory testing by the procedures set forth herein or in Subpart B of this part.

(b) For heavy-duty engines:

(1) The Administrator, may on the basis of a written application therefore by a manufacturer, prescribe test procedures, other than those set forth in this subpart, for any motor-vehicle engine which he determines is not susceptible to satisfactory testing by the procedures set forth herein or in Subparts D and I of this part.

(2) If the manufacturer does not submit a written application for use of special test procedures but the Administrator determines that a motor-vehicle engine is not susceptible to satisfactory testing by the procedures set forth herein, the Administrator will reject the applicable portions of the application. The Administrator shall notify the manufacturer in writing and set forth the reasons for such rejection in accordance with the provisions of § 86.079-22(c).

[42 FR 45144, Sept. 8, 1977]

§ 86.079-31 Separate certification.

Where possible a manufacturer should include in a single application for certification all vehicles (or engines) for which certification is required. A manufacturer may, however, choose to apply separately for certification of part of his product line. The selection of test vehicles (or test engines) and the computation of test results will be determined separately for each application.

[42 FR 45149, Sept. 8, 1977]

§ 86.079-32 Addition of a vehicle or engine after certification.

(a) If a manufacturer proposes to add to his product line a vehicle (or engine) of the same engine-system combination as vehicles (or engines) previously certified but which was not described in the application for certification when the test vehicle(s) (or test engine(s)) representing other vehicles (or engines) of that combination was certified, he shall notify the Administrator. Such notification shall be in advance of the addition unless the manufacturer elects to follow the procedure described in § 86.079-34. This notification shall include a full description of the vehicle (or engine) to be added.

(b) The Administrator may require the manufacturer to perform such tests on the test vehicle(s) (or test engine(s)) representing the vehicle (or engine) to be added which would have been required if the vehicle (or engine) had been included in the original application for certification.

(c) If, after a review of the test reports and data submitted by the manufacturer, and data derived from any testing conducted under § 86.079-29, the Administrator determines that the test vehicle(s) or test engine(s) meets all applicable standards, the appropriate certificate will be amended accordingly. If the Administrator determines that the test vehicle(s) (or test engine(s)) does not meet applicable standards, he will proceed under § 86.079-30(b).

[42 FR 45149, Sept. 8, 1977]

§ 86.079-33 Changes to a vehicle or engine covered by certification.

(a) The manufacturer shall notify the Administrator of any change in production vehicles (or production engines) in respect to any of the parameters listed in § 86.079-24(a)(3), § 86.079-24(b)(1)(iii), § 86.079-24(b)(2)(iii) or § 86.079-24(b)(3)(iii) as applicable, giving a full description of the change. Such notification shall be in advance of the change unless the manufacturer elects to follow the procedure described in § 86.079-34.

(b) Based upon the description of the change, and data derived from such testing as the Administrator may require or conduct. The Administrator will determine whether the vehicle (or engine), as modified, would still be covered by the certificate of conformity then in effect.

(c) If the Administrator determines that the outstanding certificate would cover the modified vehicles (or engines) he will notify the manufacturer in writing. Except as provided in § 86.079-34 the change may not be put into effect prior to the manufacturer's receiving this notification. If the Administrator determines that the modified vehicles (or engines) would not be covered by the certificate then in effect, the modified vehicles (or engines) shall be treated as additions to the product line subject to § 86.079-32.

[42 FR 45149, Sept. 8, 1977]

§ 86.079-34 Alternative procedure for notification of additions and changes.

(a) A manufacturer may, in lieu of notifying the Administrator in advance of an addition of a vehicle (or engine) under § 86.079-32 or a change in a vehicle (or engine) under § 86.079-33 notify him concurrently with the making of the change if the manufacturer believes the addition or change will not require any testing under the appropriate section. Upon notification to the Administrator, the manufacturer may proceed to put the addition or change into effect.

(b) The manufacturer may continue to produce vehicles (or engines) as described in the notification to the Administrator for a maximum of 30 days, unless the Administrator grants an extension in writing. This period may be shortened by a notification in accordance with paragraph (c) of this section.

(c) If the Administrator determines, based upon a description of the addition or change, that no test data will be required, he will notify the manufacturer in writing of the acceptability of the addition or change. If the Administrator determines that test data will be required, he will notify the manufacturer to rescind the change within 5 days of receipt of the notification. The Administrator will then proceed as in § 86.079-32 (b) and (c), or § 86.079-33 (b) and (c), as appropriate.

(d) Election to produce vehicles (or engines) under this section will be deemed to be a consent to recall all vehicles (or engines) which the Administrator determines under § 86.079-32(c) do not meet applicable standards, and to cause such noncomformity to be remedied at no expense to the owner.

[42 FR 45149, Sept. 8, 1977]

§ 86.079-36 Submission of vehicle identification numbers.

(a) Upon request of the Administrator, the manufacturer of any light-duty vehicle or light-duty truck covered by a certificate of conformity shall, within 30 days, identify by vehicle identification number, the vehicle(s) covered by the certificate of conformity.

(b) The manufacturer of any light-duty vehicle or light-duty truck covered by a certificate of conformity shall provide to the Administrator, within 60 days of the issuance of a certificate of conformity, an explanation of the elements in any vehicle identification coding system in sufficient detail to enable the Administrator to identify those vehicles which are covered by a certificate of conformity.

[43 FR 52920, Nov. 14, 1978]

§ 86.079-37 Production vehicles and engines.

(a) Any manufacturer obtaining certification under this part shall supply to the Administrator, upon his request, a reasonable number of production vehicles (or engines) selected by

the Administrator which are representative of the engines, emission control systems, fuel systems, and transmissions offered and typical of production models available for sale under the certificate. These vehicles (or engines) shall be supplied for testing at such time and place and for such reasonable periods as the Administrator may require. Heavy-duty engines supplied under this paragraph may be required to be mounted in chassis and appropriately equipped for operation on a chassis dynamometer.

(b)(1) Any manufacturer of light-duty vehicles or light-duty trucks obtaining certification under this part shall notify the Administrator, on a quarterly basis, of the number of vehicles domestically produced for sale in the United States and the number of vehicles produced and imported for sale in the United States during the preceding quarter. A manufacturer may elect to provide this information every 60 days instead of quarterly, to combine it with the notification required under § 86.079-36. The notification must be submitted 30 days after the close of the reporting period. The vehicle production information required shall be submitted as follows:

(i) Total production volume expressed in terms of units produced;

(ii) Model type production volume, expressed for each model type in terms of units produced and as a percentage of total production;

(iii) Base level production volume, expressed for each base level in terms of units produced and as a percentage of:

(A) Total production of its respective model type(s), and

(B) Total production; and

(iv) Vehicle configuration production volume, expressed for each vehicle configuration in terms of units produced, and as a percentage of the total production of its respective base level. In addition, each vehicle configuration shall be identified by its appropriate engine-system combination.

(2) All light-duty vehicles and light-duty trucks covered by a certificate of conformity under § 86.079-30(a) shall be adjusted by the manufacturer to the ignition or injection timing specification detailed in § 86.079-36(a)(1)(iii)(D).

(c) Any heavy-duty engine manufacturer obtaining certification under this part shall notify the Administrator, on a quarterly basis, of the number of engines of such engine family-engine displacement-exhaust emission control system-fuel system combination produced for sale in the United States during the preceding quarter.

(d) The following definitions apply to this section:

(1) "Model type" means a unique combination of car line, basic engine, and transmission class.

(2) "Base level" means a unique combination of basic engine, inertia weight, and transmission class.

(3) "Vehicle configuration" means a unique combination of basic engine, engine code, inertia weight, transmission configuration, and axle ratio within a base level.

[42 FR 45150, Sept. 8, 1977]

§ 86.079-39 Submission of maintenance instructions.

(a) The manufacturer shall provide to the Administrator, no later than the time of the submission required by § 86.079-23, a copy of the maintenance instructions which the manufacturer proposes to supply to the ultimate purcahser in accordance with § 86.079-38(a). The Administrator will review such instructions to determine whether they are reasonable and necessary to assure the proper functioning of the vehicle's (or engine's emission control systems. The Administrator will notify the manufacturer of his determination whether such instructions are reasonable and necessary to assure the proper functioning of the emission control systems.

(b) Any revision to the maintenance instructions which will affect emissions shall be supplied to the Administrator at least 30 days before being supplied to the ultimate purchaser unless the Administrator consents to a lesser period of time.

[42 FR 45151, Sept. 8, 1977]

§ 86.080-10 Emission standards for 1980 gasoline-fueled heavy-duty engines.

(a)(1) Exhaust emissions from new 1980 model year gasoline-fueled heavy-duty engines shall not exceed one of the two following standards, to be selected at the manufacturer's option:

(i)(A) *Hydrocarbons.* 1.5 grams per brake horsepower hour.

(B) *Carbon monoxide.* 25 grams per brake horsepower hour.

(C) *Hydrocarbons plus oxides of nitrogen.* 10 grams per brake horsepower hour.

(ii)(A) *Hydrocarbons plus oxides of nitrogen.* 5.0 grams per brake horsepower hour.

(B) *Carbon monoxide.* 25 grams per brake horsepower hour.

(2) The standards set forth in paragraph (a)(1) of this section refer to exhaust gaseous emissions generated under the conditions set forth in Subpart D of this part and measured in accordance with those procedures. For low-volume manufacturers, as defined in § 86.080-24(e), the test procedure in either Subpart D or Subpart H of this part may be used; however, standards (a)(1)(i)(A) and (a)(1)(i)(C) shall be reduced by 0.5 gram per brake horsepower hour if Subpart H of this part is used.

(b) [Reserved]

(c) No crankcase emissions shall be discharged into the ambient atmosphere from any new 1980 and later model year gasoline-fueled heavy-duty engine.

(d) Every manufacturer of new motor vehicle engines subject to the standards prescribed in this section shall, prior to taking any of the actions specified in section 203(a)(1) of the Act, test or cause to be tested motor vehicle engines in accordance with applicable procedures to ascertain that such test engines meet the requirements of paragraphs (a) and (c) of this section.

[42 FR 45151, Sept. 8, 1977]

§ 86.080-11 Emissions standards for 1980 Diesel heavy-duty engines.

(a)(1) Exhaust emissions from new 1980 model year Diesel heavy-duty engines shall not exceed one of the two following standards, to be selected at the manufacturer's option:

(i)(A) *Hydrocarbons.* 1.5 grams per brake horsepower hour.

(B) *Carbon monoxide.* 25 grams per brake horsepower hour.

(C) *Hydrocarbon plus oxides of nitrogen.* 10 grams per brake horsepower hour.

(ii) (A) *Hydrocarbons plus oxides of nitrogen.* 5 grams per brake horsepower hour.

(B) *Carbon monoxide.* 25 grams per brake horsepower hour.

(2) The standards set forth in paragraph (a)(1) of this section refer to exhaust gaseous emissions generated under the conditions set forth in Subpart D of this part and measured in accordance with those procedures. For low volume manufacturers, as defined in § 86.080-24(e), the test procedure in either Subpart D or Subpart J of this part may be used.

(b)(1) The opacity of smoke emissions from new 1980 and later model year diesel heavy-duty engines shall not exceed:

(i) 20 percent during the engine acceleration mode.

(ii) 15 percent during the engine lugging mode.

(iii) 50 percent during the peaks in either mode.

(2) The standards set forth in paragraph (b)(1) of this section refer to exhaust smoke emissions generated under the conditions set forth in Subpart I and measured and calculated in accordance with those procedures.

(c) [Reserved]

(d) Every manufacturer of new motor vehicle engines subject to the standards prescribed in this section shall, prior to taking any of the actions specified in section 203(a)(1) of the Act, test or cause to be tested motor vehicle engines in accordance with applicable procedures to ascertain that such test engines meet the requirements of paragraphs (a) and (b) of this section.

[42 FR 45152, Sept. 8, 1977]

§ 86.080-12 Alternative certification procedures.

(a)(1) The Administrator will determine which of the following certification procedures (paragraph (a)(3) or (a)(4) of this section) may be used to

demonstrate compliance for each heavy-duty engine, light-duty vehicle, and light-duty truck engine family for which certification is sought.

(2) The families selected for the procedure described in paragraph (a)(3) of this section will be subject to this procedure at the option of the manufacturer.

(3) The following provisions apply to those heavy-duty engine, light-duty vehicle, and light-duty truck engine families which the Administrator has specified may be subject to the abbreviated certification review procedure.

(i) The manufacturer shall satisfy all applicable requirements of Part 86 necessary to demonstrate compliance with the applicable standards for each class of new motor vehicles or new motor vehicle engines for which certification is sought.

(ii) As specifically allowed by the Administrator, the manufacturer shall assume the responsibility for part or all of the decisions applicable to the family for which certification is sought and which are within the jurisdiction of the Administrator, with the exception that the Administrator will determine whether a test vehicle, or test engine, has met the applicable emission standards.

(iii) The manufacturer shall maintain, update, and correct all records and information required.

(iv) The Administrator may review a manufacturer's records at any time. At the Administrator's discretion, this review may take place either at the manufacturer's facility or at another facility designated by the Administrator.

(v) At the Administrator's request, the manufacturer shall notify the Administrator of the status of the certification program including projected schedules of those significant accomplishments specified by the Administrator.

(vi) The manufacturer shall permit the Administrator to inspect any facilities, records, and vehicles from which data are obtained under the abbreviated certification review procedure.

(vii) Upon completing all applicable requirements of Part 86, the manufacturer shall submit a separate application for a certificate of conformity for each set of standards and each class of new motor vehicles or new motor vehicle engines for which certification is sought. Such application shall be made in writing to the Administrator by the manufacturer.

(A) The Administrator may approve or disapprove, in whole or in part, an application for certification according to the procedures specified in § 86.080-22(b).

(B) If, after a review of the application for certification, test reports and data submitted by the manufacturer, data obtained during an inspection, and any other pertinent data or information, the Administrator determines that a test vehicle(s) or test engine(s) has not met the requirements of the Act and the applicable subpart, he will notify the manufacturer in writing and set forth the reason(s) for the determination as specified in § 86.080-22(c).

(4) Those families which are to be subjected to the complete EPA review procedure will follow the procedures specified in this subpart with the exception of § 86.080-12(a)(3).

(b) The manufacturer may request that an engine family be subject to the abbreviated certification review procedure.

(c) The Administrator may require that an engine family previously allowed to be subject to the abbreviated certification review procedure be transferred to the complete review procedure.

[45 FR 26045, Apr. 17, 1980]

§ 86.081-5 General standards; increase in emissions; unsafe conditions.

(a)(1) Every new motor vehicle (or new motor vehicle engine) manufactured for sale, sold, offered for sale, introduced, or delivered for introduction into commerce, or imported into the United States for sale or resale which is subject to any of the standards prescribed in this subpart shall be covered by a certificate of conformity issued pursuant to §§ 86.081-21, 86.081-22, 86.079-23, and §§ 86.079-29 through 86.079-34.

(2) No heavy-duty vehicle manufacturer shall take any of the actions specified in section 203(a)(1) of the

Act with respect to any gasoline-fueled or Diesel heavy-duty vehicle which uses an engine which has not been certified as meeting applicable standards. Each heavy-duty vehicle manufacturer shall provide to the Administrator prior to the beginning of each model year a statement signed by an authorized representative which includes the following information:

(i) A description of the vehicles which will be produced subject to this section;

(ii) Identification of the engines used in the vehicles;

(iii) Projected sales data on each vehicle-engine combination;

(iv) A statement that the engines will not be modified by the vehicle manufacturer or a detailed specification of any changes which will be made. Changes made solely for the purpose of mounting an engine in a vehicle need not be included.

(v) A statement that the engine maintenance instruction supplied by the engine manufacturer, in compliance with § 86.079-38, will be furnished to the ultimate purchaser. If these maintenance instructions are modified, a detailed description of the modifications and a justification for each must be provided to the Administrator for review. The Administrator will notify the manufacturer of the determination whether the modified instructions are reasonable and necessary to assure proper functioning of the emission control system.

(b)(1) Any system installed on or incorporated in a new motor vehicle (or new motor vehicle engine) to enable such vehicle (or engine) to conform to standards imposed by this subpart.

(i) Shall not in its operation or function cause the emission into the ambient air of any noxious or toxic substance that would not be emitted in the operation of such vehicle (or engine) without such system, except as specifically permitted by regulation; and

(ii) Shall not in its operation, function, or malfunction result in any unsafe condition endangering the motor vehicle, its occupants, or persons or property in close proximity to the vehicle.

(2) In establishing the physically adjustable range of each adjustable parameter of a light-duty vehicle or light-duty truck, the manufacturer shall insure that, taking into consideration the production tolerances, safe vehicle driveability characteristics are available within that range, as required by § 202(a)(4) of the Clean Air Act.

(3) Every manufacturer of new motor vehicles (or new motor vehicle engines) subject to any of the standards imposed by this subpart shall, prior to taking any of the actions specified in section 203(a)(1) of the Act, test or cause to be tested motor vehicles (or motor vehicle engines) in accordance with good engineering practice to ascertain that such test vehicles (or test engines) will meet the requirements of this section for the useful life of the vehicle (or engine).

[44 FR 2970, Jan. 12, 1979]

§ 86.081-8 Emission standards for 1981 light-duty vehicles.

(a)(1) Exhaust emissions from 1981 and later model year light-duty vehicles shall not exceed:

(i) *Hydrocarbons.* 0.41 grams per vehicle mile (0.255 grams per vehicle kilometer);

(ii) Carbon monoxide—3.4 grams per vehicle mile (2.11 grams per vehicle kilometer), except that carbon monoxide emissions from light-duty vehicles of the following 1981 model year engine families shall not exceed 7.0 grams per vehicle mile (4.35 grams per vehicle kilometer):

Manufacturer	Engine family
American Motors Corporation	151 CID.
	258 CID.
BL Cars, Ltd	215 CID.
	326 CID.
Chrysler Corporation	1.7 liter.
	2.2 liter.
	2.6 liter.
	3.7 liter.
	5.2 liter/2-V.
	5.2 liter/4-V.
Excalibur Motors, Ltd	305 CID.
Ford Motor Company	1.3 liter.
	1.6 liter/2V overhead camshaft.
	2.3 liter/ turbocharged.
	1.3 liter.

Manufacturer	Engine family
General Motors Corporation	1.6 liter
	2.8 liter/173 CID-2V
	3.8 liter/231 CID-2V
	3.8 liter/231 CID-4V turbocharged
	6.0 liter/modulated displacement (M-D) (V8-6-4)
Lotus Cars, Ltd	2.0 liter
Subaru of America, Inc	1.6 liter
	1.8 liter
Toyo Kogyo Co., Ltd	91 CID
	120 CID
Toyota Motor Company, Ltd	88.6 CID

(iii) Oxides of nitrogen—1.0 grams per vehicle mile, except that: (A) Oxides of nitrogen emissions from 1981 model year light-duty vehicles manufactured by American Motors Corporation shall not exceed 2.0 grams per vehicle mile; (B) oxides of nitrogen emissions from light-duty diesel vehicles of the following 1981 model year engine families shall not exceed the prescribed levels:

Manufacturer	Engine family	Standard (gpm)
General Motors Corp	5.7 liter (L)	1.5
	1.8L	1.5
Daimler-Benz AG	2.4L	1.5
	3.0L naturally aspirated (NA)	1.5
	3.0L turbocharged (TC)	1.5
AB Volvo	2.4L-NA	1.5
Peugeot	2.3L-TC-XD2S	1.5
Volkswagen AG	1.6L-NA-2250 pounds inertia weight (I.W.)	1.3
	1.6L-NA-2500 I.W.	1.4
	2.0L-NA-3000 I.W.	1.5
Nissan Motor Company	2.8L	1.5
Isuzu Motors, Ltd	1.8L	1.5
Vehicle Technology, Inc	4-88 HTA	1.5
	4-92 HTA	1.5
	5-92 HTA	1.5
	6-92 HTA	1.5

(2) The standards set forth in paragraph (a)(1) of this section refer to the exhaust emitted over a driving schedule as set forth in Subpart B of this part and measured and calculated in accordance with the procedures outlined in either § 86.109-78 or § 86.110-82.

(b)(1) Fuel evaporative emissions from 1981 and later model year gasoline-fueled light-duty vehicles shall not exceed:

(i) *Hydrocarbons.* 2.0 grams per test.

(2) The standard set forth in paragraph (b)(1) of this section refers to a composite sample of the fuel evaporative emissions collected under the conditions set forth in Subpart B of this part and measured in accordance with those procedures.

(c) No crankcase emissions shall be discharged into the ambient atmosphere from any 1981 and later model year gasoline-fueled light-duty vehicle.

(d)(1) Model year 1981 light-duty vehicles sold for principal use at designated high-altitude locations shall not exceed the following exhaust emission standards when tested at the high-altitude reference point if the manufacturer of such vehicles elects to demonstrate compliance with the high-altitude emission standards.

(i) *Hydrocarbons.* 0.57 grams per vehicle mile;

(ii) *Carbon monoxide.* 7.8 grams per vehicle mile;

(iii) *Oxides of nitrogen.* 1.0 gram per vehicle mile, except that oxides of nitrogen emissions from 1981 light-duty vehicles manufactured by American Motors Corporation shall not exceed 2.0 grams per vehicle mile.

(2) The standards set forth in paragraph (d)(1) of this section refer to the exhaust emitted over a driving schedule as set forth in Subpart B of this part and measured and calculated in accordance with those procedures.

(e)(1) Fuel evaporative emissions from 1981 model year gasoline-fueled light-duty vehicles sold for principal use at designated high-altitude areas shall not exceed 2.6 gram per test when tested at the high-altitude reference point if the manufacturer of such vehicles elects to demonstrate compliance with the high-altitude emission standards.

(2) The standard set forth in paragraph (e)(1) of this section refers to a composite sample of the fuel evaporative emissions collected under the conditions set forth in Subpart B of this part and measured in accordance with those procedures.

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[45 FR 14504, Mar. 5, 1980, as amended at 45 FR 20404, Mar. 27, 1980; 47 FR 6630, Feb. 16, 1982; 47 FR 14905, Apr. 7, 1982]

§ 86.081-9 Emission standards for 1981 light-duty trucks.

(a)(1) Exhaust emissions from 1981 and later model year light-duty trucks shall not exceed:

(i) *Hydrocarbons.* 1.7 grams per vehicle mile (1.06 grams per vehicle kilometer);

(ii) *Carbon monoxide.* 18 grams per vehicle mile (11.16 grams per vehicle kilometer);

(iii) *Oxides of nitrogen.* 2.3 grams per vehicle mile (1.43 grams per vehicle kilometer);

(2) The standards set forth in paragraph (a)(1) of this section refer to the exhaust emitted over a driving schedule as set forth in Subpart B of this part and measured and calculated in accordance with the procedures outlined in either § 86.109-78 or § 86.110-82.

(b)(1) Evaporative emissions from 1981 and later model year gasoline-fueled light-duty trucks shall not exceed:

(i) *Hydrocarbons.* 2.0 grams per test.

(2) The standard set forth in paragraph (b)(1) of this section refers to a composite sample of the evaporative emissions collected under the conditions set forth in Subpart B of this part and measured in accordance with those procedures.

(c) No crankcase emissions shall be discharged into the ambient atmosphere from any 1981 and later model year gasoline-fueled light-duty trucks.

(d)(1) Model year from 1981 light-duty trucks sold for principal use at designated high-altitude locations shall not exceed the following exhaust emission standards when tested at the high-altitude reference point if the manufacturer of such vehicles elects to demonstrate compliance with the high-altitude standards.

(i) *Hydrocarbons.* 2.0 grams per vehicle mile;

(ii) *Carbon monoxide.* 26.0 grams per vehicle mile;

(iii) *Oxides of nitrogen.* 2.3 grams per vehicle mile.

(2) The standards set forth in paragraph (d)(1) of this section refer to the exhaust emitted over a driving schedule as set forth in Subpart B of this part and measured and calculated in accordance with those procedures.

(e)(1) Fuel evaporative emissions from 1981 model year gasoline-fueled light-duty trucks sold for principal use at designated high-altitude areas shall not exceed 2.6 grams per test when tested at the high-altitude reference point if the manufacturer of such vehicles elects to demonstrate compliance with high-altitude emission standards.

(2) The standard set forth in paragraph (e)(1) of this section refers to a composite sample of the fuel evaporative emissions collected under the conditions set forth in Subpart B of this part and measured in accordance with those procedures.

[45 FR 14505, Mar. 5, 1980, as amended at 45 FR 20404, Mar. 27, 1980]

§ 86.081-13 Alternative Durability Program.

(a) The procedures of the Alternative Durability Program are optional. Manufacturers may use these optional procedures to determine deterioration factors instead of using the procedures that this subpart otherwise requires.

(b) The optional procedures of the Alternative Durability Program apply only to light-duty vehicles and light-duty trucks, and are effective only for the 1981 through 1984 model years. All manufacturers of these vehicles are eligible to participate in this program.

(c) For engine families subject to the procedures of the Alternative Durability Program, the manufacturer shall submit deterioration factors to the Administrator for approval to use them for certification. The Administrator shall approve the use of deterioration factors that:

(1) The manufacturer attests are representative of the durability performance of its vehicles in actual field use when maintained according to the manufacturer's maintenance instructions (as limited under § 86.079-25(a)), and

(2) Are equal to or greater than the deterioration factors that EPA determines under paragraph (d) of this section.

(d) EPA shall determine minimum deterioration factors for engine families subject to the Alternative Durability Program. This determination shall be based on a procedure of grouping engine families (see § 86.081-24(a)) in order to use historical certification data to determine deterioration factors for each engine family group. The historical data shall be updated yearly through the testing of production durability-data vehicles. Test vehicle requirements under these procedures are contained in § 86.081-24(c)(1)(iii) and compliance requirements are contained in § 86.081-28(a)(5).

(e) *Request procedures.* (1) A manufacturer wishing to participate in the Alternative Durability Program must submit to the Administrator a written request describing the engine families that the manufacturer elects to be included in the program.

(2) The Administrator may declare ineligible any engine family for which the Administrator determines there is unreasonable risk in determining a deterioration factor using the methods of the Alternative Durability Program. Furthermore, the Administrator may limit the number of engine families within the manufacturer's product line that are eligible for the Alternative Durability Program.

(3) Upon approval of the manufacturer's request to participate, the Administrator and the manufacturer may enter into a written agreement prescribing the terms and conditions of the program. This agreement shall be equitable with agreements entered in with all other manufacturers. The agreement shall specify the following:

(i) The engine families to be included in the program and the engine family groups that have been established by the provisions of § 86.081-24(a)(8) and (9).

(ii) The procedures for the selection of production durability-data vehicles specified under the provisions of § 86.081-24(h).

(iii) The procedures for the determination of minimum exhaust emission deterioration factors for each engine family group.

(f) A manufacturer may elect, at any time, to discontinue participation in this program for all or part of the product line. However, only entire engine family groups may be discontinued. If the manufacturer still wishes to certify any vehicles from a discontinued engine family group, the mandatory requirements of this subpart must be met.

[45 FR 44191, June 30, 1980]

§ 86.081-29 Testing by the Administrator.

(a)(1) Paragraph (a) of this section applies to light-duty vehicles and light-duty trucks.

(2) The Administrator may require that any one or more of the test vehicles be submitted to him, at such place or places as he may designate, for the purposes of conducting emissions tests. The Administrator may specify that he will conduct such testing at the manufacturer's facility, in which case instrumentation and equipment specified by the Administrator shall be made available by the manufacturer for test operations. Any testing conducted at a manufacturer's facility pursuant to this paragraph shall be scheduled by the manufacturer as promptly as possible.

(3)(i) Whenever the Administrator conducts a test on a test vehicle, the results of that test shall, unless subsequently invalidated by the Administrator, comprise the official data for the vehicle at the prescribed test point and the manufacturer's data for that prescribed test point shall not be used in determining compliance with emission standards.

(ii) Whenever the Administrator does not conduct a test on a test vehicle at a test point, the manufacturer's test data will be accepted as the official data for that test point: *Provided*, That if the Administrator makes a determination based on testing under paragraph (a)(2) of this section that there is a lack of correlation between the manufacturer's test equipment and the test equipment used by the Administrator, no manufacturer's test data will be accepted for purposes of certification until the reasons for the lack of correlation are determined and the validity of the data is established by the manufacturer; *And, further provided*, That if the Administrator has reasonable basis to believe that any

test data submitted by the manufacturer is not accurate or has been obtained in violation of any provisions of this part, the Administrator may refuse to accept that data as the official data pending retesting or submission of further information. If the manufacturer conducts more than one test on a vehicle, as authorized under § 86.079-26(a)(3)(i)(A), the data from the last test in that series of tests on that vehicle will constitute the official data.

(iii)(A)(*1*) The Administrator may adjust or cause to be adjusted any adjustable parameter of an emission data vehicle or engine which the Administrator has determined to be subject to adjustment for certification and Selective Enforcement Audit testing in accordance with § 86.081-22(e)(1), to any setting within the physically adjustable range of that parameter, as determined by the Administrator in accordance with § 86.081-22(e)(3)(i), prior to the performance of any tests to determine whether such vehicle or engine conforms to applicable emission standards, including tests performed by the manufacturer under § 86.079-23(c)(1). However, if the idle speed parameter is one which the Administrator has determined to be subject to adjustment, the Administrator shall not adjust it to a setting which causes a higher engine idle speed than would have been possible within the physically adjustable range of the idle speed parameter on the vehicle before it accumulated any mileage, all other parameters being adjusted identically for the purpose of comparison. The Administrator, in making or specifying such adjustments, will consider the effect of the deviation from the manufacturer's recommended setting on emissions performance characteristics as well as the likelihood that similar settings will occur on in-use light-duty vehicles or light-duty trucks. In determining likelihood, the Administrator will consider factors such as, but not limited to, the effect of the adjustment on vehicle performance characteristics and surveillance information from similar in-use vehicles.

(*2*) For those vehicle or engine parameters which the Administrator has not determined to be subject to adjustment during certification and Selective Enforcement Audit testing in accordance with § 86.081-22(e)(1), the emission data vehicle presented to the Administrator for testing shall be calibrated within the production tolerances applicable to the manufacturer's specifications to be shown on the vehicle label (see § 86.079-35(a)(1)(iii)(D)) as specified in the application for certification. If the Administrator determines that a vehicle is not within such tolerances, the vehicle will be adjusted, at the facility designated by the Administrator, prior to the test and an engineering report shall be submitted to the Administrator describing the corrective action taken. Based on the engineering report, the Administrator will determine if the vehicle will be used as an emission data vehicle.

(B) If the Administrator determines that the test data developed on an emission-data vehicle under paragraph (a)(3)(i) of this section would cause that vehicle to fail due to excessive 4,000 mile emissions or by application of the appropriate deterioration factor, then the following procedure shall be observed:

(*1*) The manufacturer may request a retest. Before the retest, those vehicle or engine parameters which the Administrator has not determined to be subject to adjustment for certification and Selective Enforcement Audit testing in accordance with § 86.081-22(e)(1) may be readjusted to the manufacturer's specifications, if these adjustments were made incorrectly prior to the first test. The Administrator may adjust or cause to be adjusted any parameter which the Administrator has determined to be subject to adjustment to any setting within the physically adjustable range of that parameter, as determined by the Administrator in accordance with § 86.081-22(e)(3)(i). However, if the idle speed parameter is one which the Administrator has determined to be subject to adjustment, the Administrator shall not adjust it to a setting which causes a higher engine idle speed than would have been possible within the physically adjustable range of the idle speed parameter on the vehicle before it accumulated any mileage, all other parameters being adjusted identically

for the purpose of comparison. Other maintenance or repairs may be performed in accordance with § 86.079-25. All work on the vehicle shall be done at such location and under such conditions as the Administrator may prescribe.

(2) The vehicle will be retested by the Administrator and the results of this test shall comprise the official data for the emission-data vehicle.

(iv) If sufficient durability data are not available at the time of any emission test conducted under paragraph (a)(2) of this section to enable the Administrator to determine whether an emission-data vehicle would fail, the manufacturer may request a retest in accordance with the provisions of paragraphs (a)(3)(iii) (A) and (B) of this section. If the manufacturer does not promptly make such request, he shall be deemed to have waived the right to a retest. A request for retest must be made before the manufacturer removes the vehicle from the test premises.

(b) (1) Paragraph (b) of this section applies to heavy-duty engines.

(2) The Administrator may require that any one or more of the test engines be submitted to him, at such place or places as he may designate, for the purpose of conducting emissions tests. The Administrator may specify that he will conduct such testing at the manufacturer's facility, in which case instrumentation and equipment specified by the Administrator shall be made available by the manufacturer for test operations. Any testing conducted at a manufacturer's facility pursuant to this paragraph shall be scheduled by the manufacturer as promptly as possible.

(3) (i) Whenever the Administrator conducts a test on a test engine the results of that test, unless subsequently invalidated by the Administrator, shall comprise the official data for the engine at that prescribed test point and the manufacturer's data for that prescribed test point shall not be used in determining compliance with emission standards.

(ii) Whenever the Administrator does not conduct a test on a test engine at a test point, the manufacturer's test data will be accepted as the official data for that test point: *Provided,* That if the Administrator makes a determination based on testing under paragraph (b)(2) of this section that there is a lack of correlation between the manufacturer's test equipment and the test equipment used by the Administrator, no manufacturer's test data will be accepted for purposes of certification until the reasons for the lack of correlation are determined and the validity of the data is established by the manufacturer: *And further provided,* That if the Administrator has reasonable basis to believe that any test data submitted by the manufacturer is not accurate or has been obtained in violation of any provision of this part, the Administrator may refuse to accept that data as the official data pending retesting or submission of further information.

(iii)(A) The emission-data engine presented to the Administrator for testing shall be calibrated within the production tolerances applicable to the manufacturer's specifications to be shown on the engine label (see § 86.079-35(a)(2)(iii) as specified in the application for certification. If the Administrator determines that an engine is not within such tolerances, the engine shall be adjusted at the facility designated by the Administrator prior to the test and an engineering report shall be submitted to the Administrator describing the corrective action taken. Based on the engineering report the Administrator will determine if the engine shall be used as an emission-data engine.

(B) If the Administrator determines that the test data developed under paragraph (b)(3)(iii)(A) of this section would cause the emission-data engine to fail due to excessive 125-hour emission values or by the application of the appropriate deterioration factor, then the following procedure shall be observed.

(*1*) The manufacturer may request a retest. Before the retest, the engine may be readjusted to manufacturer's specifications if these adjustments were made incorrectly prior to the first test, and other maintenance or repairs may be performed in accordance with § 86.079-25. All work on the engine shall be done at such location

and under such conditions as the Administrator may prescribe.

(2) The engine will be retested by the Administrator and the results of this test shall comprise the official data for the emission-date engine.

(iv) If sufficient durability data are not available at the time of any emission test conducted under paragraph (b)(2) of this section to enable the Administrator to determine whether an emission-data engine would fail, the manufacturer may request a retest in accordance with the provisions of paragraphs (b)(3)(iii)(B) (*1*) and (*2*) of this section. If the manufacturer does not promptly make such request, he shall be deemed to have waived the right to a retest. A request for retest must be made before the manufacturer removes the engine from the test premises.

[44 FR 2972, Jan. 12, 1979]

§ 86.082-1 General applicability.

(a) The provisions of this subpart apply to 1982 and later model year new gasoline-fueled and diesel light-duty vehicles, 1982 and later model year new gasoline-fueled and diesel light-duty trucks, and 1982 and later model year new gasoline-fueled and diesel heavy-duty engines.

(b) *Optional applicability.* A manufacturer may request to certify any heavy-duty vehicle 10,000 pounds GVWR or less as a light-duty truck: Heavy-duty vehicle provisions do not apply to such a vehicle.

(c) *High-altitude certification.* The provisions of this subpart applicable to light-duty vehicles and light-duty trucks sold for principal use at designated high-altitude locations shall apply only during the 1982 and 1983 model years.

(d) *Alternative Durability Program.* For 1981 through 1984 model year light-duty vehicles and light-duty trucks, a manufacturer may elect to participate in the Alternative Durability Program. This optional program provides an alternative method of determining exhaust emission control system durability. The general procedures and a description of the program are contained in § 86.081-13 and specific provisions on test vehicles and compliance procedures are contained in § 86.082-24 and § 86.082-28 respectively.

(e) *Small-volume manufacturers.* Special certification procedures are available for any manufacturer whose projected combined U.S. sales of light-duty vehicles, light-duty trucks, and heavy-duty engines in its product line is fewer than 10,000 units for the model year in which the manufacturer seeks certification. In order to certify its product line under these optional procedures, the small-volume manufacturer must first obtain the Administrator's approval. Vehicles produced at facilities leased, operated, controlled, supervised, or in ten percent or greater part owned by the manufacturer shall be counted in calculating the total sales of the manufacturer. The small-volume manufacturer's certification procedures are described in § 86.082-14.

[45 FR 67002, Oct. 8, 1980, as amended at 46 FR 50475, Oct. 13, 1981]

§ 86.082-2 Definitions.

(a) The definitions of this section apply to this subpart and also to Subparts B, D, and I of this part.

(b) As used in this subpart, all terms not defined herein shall have the meaning given them in the Act:

"Accuracy" means the difference between a measurement and true value.

"Act" means Part A of Title II of the Clean Air Act, 42 U.S.C. as amended, 7521, *et seq.*

"Administrator" means the Administrator of the Environmental Protection Agency or his authorized representative.

"Auxiliary Emission Control Device (AECD)" means any element of design which senses temperature, vehicle speed, engine RPM, transmission gear, manifold vaccum, or any other parameter for the purpose of activating, modulating, delaying, or deactivating the operation of any part of the emission control system.

"Basic engine" means a unique combination of manufacturer, engine displacement, number of cylinders, fuel system (as distinguished by number of carburetor barrels or use of fuel injection), catalyst usage, and other engine

and emission control system characteristics specified by the Administrator.

"Basic vehicle frontal area" means the area enclosed by the geometric projection of the basic vehicle along the longitudinal axis, which includes tires but excludes mirrors and air deflectors, onto a plane perpendicular to the longitudinal axis of the vehicle.

"Body style" means a level of commonality in vehicle construction as defined by number of doors and roof treatment (e.g., sedan, convertible, fastback, hatchback).

"Body type" means a name denoting a group of vehicles that are either in the same car line or in different car lines provided the only reason the vehicles qualify to be considered in different car lines is that they are produced by a separate division of a single manufacturer.

"Calibrating gas" means a gas of known concentration which is used to establish the response curve of an analyzer.

"Calibration" means the set of specifications, including tolerances, unique to a particular design, version, or application of a component or components assembly capable of functionally describing its operation over its working range.

"Car line" means a name denoting a group of vehicles within a make or car division which has a degree of commonality in construction (e.g., body, chassis). Car line does not consider any level of decor or opulence and is not generally distinguished by characteristics as roofline, number of doors, seats, or windows except for station wagons or light-duty trucks. Station wagons and light-duty trucks are considered to be different car lines than passenger cars.

"Configuration" means a subclassification of an engine-system combination on the basis of engine code, inertia weight class, transmission type and gear ratios, final drive ratio, and other parameters which may be designated by the Administrator.

"Crankcase emissions" means airborne substances emitted to the atmosphere from any portion of the engine crankcase ventilation or lubrication systems.

"Curb-idle" for manual transmission code heavy-duty engines means the manufacturer's recommended engine speed with the transmission in neutral or with the clutch disengaged. For automatic transmission code heavy-duty engines, curb-idle means the manufacturer's recommended engine speed with the automatic transmission in gear and the output shaft stalled.

"Defeat Device" means an AECD that reduces the effectiveness of the emission control system under conditions which may reasonably be expected to be encountered in normal urban vehicle operation and use, unless (1) such conditions are substantially included in the Federal emission test procedure, (2) the need for the AECD is justified in terms of protecting the vehicle against damage or accident, or (3) the AECD does not go beyond the requirements of engine starting.

"Diurnal breathing losses" means evaporative emissions as a result of the daily range in temperature.

"Drive train configuration" means a unique combination of engine code, transmission configuration, and axle ratio.

"Dynamometer-idle" for automatic transmission code heavy-duty engines means the manufacturer's recommended engine speed without a transmission that simulates the recommended engine speed with a transmission and with the transmission in neutral.

"Engine code" means a unique combination, within an engine-system combination, of displacement, carburetor (or fuel injection) calibration, choke calibration, distributor calibration, auxiliary emission control devices, and other engine and emission control system components specified by the Administrator.

"Engine family" means the basic classification unit of a manufacturer's product line used for the purpose of test fleet selection and determined in accordance with § 86.082-24.

"Engine family group" means a combination of engine families for the purpose of determining a minimum deterioration factor under the Alternative Durability Program.

"Engine-system combination" means an engine family-exhaust emission control system combination.

"EPA Enforcement Officer" means any officer of employee of the Environmental Protection Agency so designated in writing by the Administrator (or by his designee).

"Evaporative emission code" means a unique combination, in an evaporative emission family-evaporative emission control system combination, of purge system calibrations, fuel tank and carburetor bowl vent calibrations and other fuel system and evaporative emission control system components and calibrations specified by the Administrator.

"Evaporative emissions" means hydrocarbons emitted into the atmosphere from a motor vehicle, other than exhaust and crankcase emissions.

"Evaporative vehicle configuration" means a unique combination of basic engine, engine code, body type, and evaporative emission code.

"Exhaust emissions" means substances emitted to the atmosphere from any opening downstream from the exhaust port of a motor vehicle engine.

"Fuel evaporative emissions" means vaporized fuel emitted into the atmosphere from the fuel system of a motor vehicle.

"Fuel system" means the combination of fuel tank(s), fuel pump, fuel lines, and carburetor or fuel injection components, and includes all fuel system vents and fuel evaporative emission control system components.

"Gross vehicle weight" means the manufacturer's gross weight rating for the individual vehicle.

"Gross vehicle weight rating (GVWR)" means the value specified by the manufacturer as the maximum design loaded weight of a single vehicle.

"Hang-up" refers to the process of hydrocarbon molecules being adsorbed, condensed, or by any other method removed from the sample flow prior to reaching the instrument detector. It also refers to any subsequent desorption of the molecules into the sample flow when they are assumed to be absent.

"Heavy-duty engine" means any engine which the engine manufacturer could reasonably expect to be used for motive power in a heavy-duty vehicle.

"Heavy-duty vehicle" means any motor vehicle rated at more than 8,500 pounds GVWR or that has a vehicle curb weight of more than 6,000 pounds or that has a basic vehicle frontal area in excess of 45 square feet.

"High altitude" means any elevation over 1,219 meters (4,000 feet).

"High-altitude conditions" means a test altitude of 1,620 meters (5,315 feet), plus or minus 100 meters (328 feet), or equivalent observed barometric test conditions of 83.3 ± 1 kilopascals.

"High-altitude reference point" means an elevation of 1,620 meters (5,315 feet) plus or minus 100 meters (328 feet), or equivalent observed barometric test conditions of 83.3 kPa (24.2 inches Hg), plus or minus 1 kPa (0.30 Hg).

"Hot-soak losses" means evaporative emissions after termination of engine operation.

"Incomplete truck" means any truck which does not have the primary load carrying device or container attached.

"Inertia weight class" means the class, which is a group of test weights, into which a vehicle is grouped based on its loaded vehicle weight in accordance with the provisions of Part 86.

"Intermediate speed" means peak torque speed if peak torque speed occurs between 60 and 75 percent of rated speed. If the peak torque speed is less than 60 percent of rated speed, intermediate speed means 60 percent of rated speed. If the peak torque speed is greater than 75 percent of rated speed, intermediate speed means 75 percent of rated speed.

"Light-duty truck" means any motor vehicle rated at 8,500 pounds GVWR or less which as a vehicle curb weight of 6,000 pounds or less and which has a basic vehicle frontal area of 45 square feet or less, which is:

(1) Designed primarily for purposes of transportation of property or is a derivation of such a vehicle, or

(2) Designed primarily for transportation of persons and has a capacity of more than 12 persons, or

(3) Available with special features enabling off-street or off-highway operation and use.

"Light-duty vehicle" means a passenger car or passenger car derivative capable of seating 12 passengers or less.

"Loaded vehicle weight" means the vehicle curb weight plus 300 pounds.

"Low altitude" means any elevation equal to or less than 1,219 meters (4,000 feet).

"Low altitude conditions" means a test altitude less than 549 meters (1,800 feet).

"Malfunction" means not operating according to specifications (e.g., those specifications listed in the application for certification).

"Maximum rated horsepower" means the maximum brake horsepower output of an engine as stated by the manufacturer in his sales and service literature and his application for certification under § 86.082-21.

"Maximum rated torque" means the maximum torque produced by an engine as stated by the manufacturer in his sales and service literature and his application for certification under § 86.082-21.

"Military engine" means any engine manufactured solely for the Department of Defense to meet military specifications.

"Model" means a specific combination of car line, body style, and drivetrain configuration.

"Model type" means a unique combination of car line, basic engine, and transmission class.

"Model year" means the manufacturer's annual production period (as determined by the Administrator) which includes January 1 of such calendar year: *Provided,* That if the manufacturer has no annual production period, the term "model year" shall mean the calendar year.

"Nominal fuel tank capacity" means the volume of the fuel tank(s), specified by the manufacturer to the nearest tenth of a U.S. gallon, which may be filled with fuel from the fuel tank filler inlet.

"Opacity" means the fraction of a beam of light, expressed in percent, which fails to penetrate a plume of smoke.

"Option" means any available equipment or feature not standard equipment on a model.

"Oxides of nitrogen" means the sum of the nitric oxide and nitrogen dioxide contained in a gas sample as if the nitric oxide were in the form of nitrogen dioxide.

"Peak torque speed" means the speed at which an engine develops maximum torque.

"Percent load" means the fraction of the maximum available torque at a specified engine speed.

"Precision" means the standard deviation of replicated measurements.

"Rated speed" means the speed at which the manufacturer specifies the maximum rated horsepower of an engine.

"Reconfigured emission-data vehicle" means an emission-data vehicle obtained by modifying a previously used emission-data vehicle to represent another emission-data vehicle.

"Running loss" means fuel evaporative emissions resulting from an average trip in an urban area or the simulation of such a trip.

"Scheduled maintenance" means any adjustment, repair, removal, disassembly, cleaning, or replacement of vehicle components or systems which is performed on a periodic basis to prevent part failure or vehicle (if the engine were installed in a vehicle) malfunction.

"Smoke" means the matter in the exhaust emission which obscures the transmission of light.

"Span gas" means a gas of known concentration which is used routinely to set the output level of an analyzer.

"Standard equipment" means those features or equipment which are marketed on a vehicle over which the purchaser can exercise no choice.

"System" includes any motor vehicle engine modification which controls or causes the reduction of substances emitted from motor vehicles.

"Tank fuel volume" means the volume of fuel in the fuel tank(s), which is determined by taking the manufacturer's nominal fuel tank(s) capacity and multiplying by 0.40, the result being rounded using ASTM E 29-67 to the nearest tenth of a U.S. gallon.

"Test weight" means the weight, within an inertia weight class, which is used in the dynamometer testing of a vehicle, and which is based on its loaded vehicle weight in accordance with the provisions of Part 86.

"Throttle" means the mechanical linkage which either directly or indirectly controls the fuel flow to the engine.

"Transmission class" means the basic type of transmission, e.g., manual, automatic, semiautomatic.

"Transmission configuration" means a unique combination, within a transmission class, of the number of the forward gears and, if applicable, overdrive. The Administrator may further subdivide a transmission configuration (based on such criteria as gear ratios, torque convertor multiplication ratio, stall speed and shift calibration, etc.), if he determines that significant fuel economy or exhaust emission differences exist within that transmission configuration.

"Unscheduled maintenance" means any adjustment, repair, removal, disassembly, cleaning, or replacement of vehicle components or systems which is performed to correct a part failure or vehicle (if the engine were installed in a vehicle) malfunction.

"Useful life" means:

(1) For light-duty vehicles and light-duty trucks a period of use of 5 years or 50,000 miles, whichever first occurs.

(2) For gasoline-fueled heavy-duty engines a period of use of 5 years or 50,000 miles of vehicle operation or 1,500 hours of engine operation (or an equivalent period of 1,500 hours of dynamometer operation), whichever first occurs.

(3) For diesel heavy-duty engines a period of use of 5 years or 100,000 miles of vehicle operation or 3,000 hours of engine operation (or an equivalent period of 1,000 hours of dynamometer operation), whichever first occurs.

"Van" means a light-duty truck having an integral enclosure, fully enclosing the driver compartment and load carrying device, and having no body sections protruding more than 30 inches ahead of the leading edge of the windshield.

"Vehicle configuration" means a unique combination of basic engine, engine code, inertia weight class, transmission configuration, and axle ratio.

"Vehicle curb weight" means the actual or the manufacturer's estimated weight of the vehicle in operational status with all standard equipment, and weight of fuel at nominal tank capacity, and the weight of optional equipment computed in accordance with § 86.082-24; incomplete light-duty trucks shall have the curb weight specified by the manufacturer.

"Zero (0) hours" means that point after normal assembly line operations and adjustments are completed and before six (6) additional operating hours have been accumulated, including emission testing, if performed.

"Zero (0) miles" means that point after initial engine starting (not to exceed 100 miles of vehicle operation, or three hours of engine operation) at which normal assembly line operations and adjustments are completed, and including emission testing, if performed.

[46 FR 50475, Oct. 13, 1981]

§ 86.082-8 Emission standards for 1982 and later model year light-duty vehicles.

(a)(1) The standards set forth in paragraphs (a) through (c) of this section shall apply for vehicles sold for principal use at other than designated high-altitude locations. Exhaust emissions from 1982 and later model year light-duty vehicles shall not exceed:

(i) *Hydrocarbons.* 0.41 grams per vehicle mile (0.255 grams per vehicle kilometer);

(ii) Carbon monoxide—3.4 grams per vehicle mile (2.11 grams per vehicle kilometer), except that carbon monoxide emissions from light-duty vehicles of the following 1982 model year engine families shall not exceed 7.0 grams per vehicle mile (4.35 grams per vehicle kilometer):

Manufacturer	Engine family
Avanti Motor Corporation	5.0 liter
American Motors Corporation	151 CID
	258 CID

Manufacturer	Engine family
BL Cars, Ltd	215 CID.
	326 CID.
	4.2 liter/fuel injected.
Chrysler Corporation	1.6 liter.
	1.7 liter.
	2.2 liter.
	2.6 liter.
	3.7 liter.
	5.2 liter/2-V.
	5.2 liter/4-V.
Excalibur Motors, Ltd	305 CID.
Ford Motor Company	1.6 liter/2V overhead camshaft.
	2.3 liter/turbocharged.
	3.3 liter.
	3.8 liter/V-6.
	4.2/5.0 liter.
	5.8 liter.
General Motors Corp	1.6 liter.
	1.8/2.0 liter.
	1.8 liter/fuel injected.
	2.5/liter/throttle body fuel injected.
	2.8 liter/173 CID-2V.
	3.0/3.8 liter/231 CID-2V.
	3.8 liter/turbocharged.
	3.8 liter/229 CID-2V.
	4.4 liter.
	5.0/5.7 liter/fuel injected.
	5.0/5.7 liter.
	6.0 liter/modulated displacement (M-D) (V8-6-4).
Lotus Cars, Ltd	2.0 liter.
	2.2 liter.
	2.2 liter/turbocharged.
	4.0 liter.
Subaru of America, Inc	1.6 liter.
	1.8 liter.
Toyota Motor Company, Ltd	88.6 CID.
Volkswagen of America	1.7 liter/feed back carburetor.

Manufacturer and engine family	Model years	Standard (g/mi)
2.4L-naturally aspirated (NA)	1982, 1983, 1984	1.25
3.0L-NA	1982	1.5
3.0L-turbocharged (TC)	1982, 1983, 1984	1.5
AB Volvo:		
2.4L-NA	1982, 1983, 1984	1.5
2.4L-TC	1983, 1984	1.5
Peugeot:		
2.3L-TC-XD2S	1982	1.5
XD2S/XD3S-TC	1983, 1984	1.5
2.3L-NA-XD2C	1982, 1983, 1984	1.2
1.9L-NA-XUD9	1983, 1984	1.5
Volkswagen AG:		
1.6L-NA-2250 pound inertia weight class (I.W.)	1982, 1983, 1984	1.3
1.6L-TC-2250 I.W	1982, 1983, 1984	1.3
1.6L-NA-2500 and 2750 I.W	1982, 1983, 1984	1.4
1.6L-TC-2500 and 2750 I.W	1982, 1983, 1984	1.4
2.0L-NA	1982, 1983, 1984	1.5
2.0L-TC	1982, 1983, 1984	1.5
Nissan Motor Company:		
2.8L	1982, 1983, 1984	1.5
XM1	1983, 1984	1.5
Isuzu Motors Ltd.: 1.8L	1982, 1983, 1984	1.5
Renault: 2.0L	1982, 1983, 1984	1.5
BL Cars, Ltd.:		
2.4L-TC	1983, 1984	1.5
3.6L-TC	1983, 1984	1.5
Chrysler Corp.: 1.9L-NA	1984	1.5
Ford Motors Company: 2.4L-TC	1984	1.5
BMW: 2.4L-TC	1984	1.5
Vehicle Technology, Inc.:		
4-88 HTA	1982, 1983	1.5
4-92 HTA	1982, 1983	1.5
5-92 HTA	1982, 1983	1.5
6-92 HTA	1982, 1983	1.5

(iii) Oxides of nitrogen—1.0 grams per vehicle mile, except that: (A) Oxides of nitrogen emissions from 1982 model year light-duty vehicles manufactured by American Motors Corporation shall not exceed 2.0 grams per vehicle mile; (B) oxides of nitrogen emissions from light-duty diesel vehicles of the following 1982 and later model year engine families shall not exceed the prescribed levels:

Manufacturer and engine family	Model years	Standard (g/mi)
General Motors Corp		
1.8 liter (L)	1982, 1983, 1984	1.5
4.3L	1982, 1983, 1984	1.5
5.7L	1982, 1983, 1984	1.5
EF-C	1983, 1984	1.5
Daimler-Benz AG:		
2.0L	1984	1.5

(iv) *Particulate emissions* (diesels only). 0.60 gram per vehicle mile (0.373 gram per vehicle kilometer).

(2) The standards set forth in paragraph (a)(1) of this section refer to the exhaust emitted over a driving schedule as set forth in Subpart B of this part amd measured and calculated in accordance with those procedures.

(b)(1) Fuel evaporative emissions from 1982 and later model year gasoline-fueled light-duty vehicles shall not exceed:

(i) *Hydrocarbons.* 2.0 grams per test.

(2) The standards set forth in paragraph (b)(1) of this section refers to a composite sample of the fuel evaporative emissions collected under the conditions set forth in Subpart B of this part and measured in accordance with those procedures.

(c) No crankcase emissions shall be discharged into the ambient atmos-

phere from any 1982 and later model year gasoline-fueled light-duty vehicle.

(d)(1) Model year 1982 and later light-duty vehicles sold for principal use at a designated high-altitude location shall be capable of meeting the following exhaust emission standards when tested under high-altitude conditions.

(i) *Hydrocarbons.* 0.57 grams per vehicle mile (0.35 grams per vehicle kilometer).

(ii) *Carbon monoxide.* 7.8 grams per vehicle mile (4.8 grams per vehicle kilometer), except that carbon monoxide emissions from 1982 model year light-duty vehicles which are specifically listed in paragraph (a)(1)(ii) of this section shall not exceed 11 grams per vehicle mile (6.8 grams per vehicle kilometer).

(iii) *Oxides of nitrogen.* The standards in paragraph (a)(1)(iii) of this section apply.

(2) The standards set forth in paragraph (d)(1) of this section refer to the exhaust emitted over a driving schedule as set forth in Subpart B of this part and measured and calculated in accordance with those procedures.

(e)(1) Fuel evaporative emissions from 1982 and later model year gasoline-fueled light-duty vehicles sold for principal use at designated high-altitude locations shall not exceed 2.6s gram per test when tested under high-altitude conditions.

(2) The standard set forth in paragraph (e)(1) of this section refers to a composite sample of the fuel evaporative emissions collected under the conditions set forth in Subpart B of this part and measured in accordance with those procedures.

(f) No crankcase emissions shall be discharged into the ambient atmosphere from any 1982 and later model year gasoline-fueled light-duty vehicles sold for principal use at designated high-altitude locations.

(g)(1) Any light-duty vehicle that a manufacturer wishes to certify for sale at low altitude must also be capable of meeting high-altitude emission standards (specified in paragraph (d) through (f) of this section). The manufacturer may specify vehicle adjustments or modifications to allow the vehicle to meet high-altitude standards but these adjustments or modifications may not alter the vehicle's basic engine, inertia weight class, transmission configuration, and axle ratio.

(i) A manufacturer may certify unique vehicle configurations to meet the high-altitude standards but is not required to certify these vehicle configurations to meet the low-altitude standards.

(ii) Any adjustments or modifications that are recommended to be performed on vehicles to satisfy the requirements of paragraph (g)(1) of this section:

(A) Shall be capable of being effectively performed by commercial repair facilities.

(B) Must be included in the manufacturer's application for certification.

(2) The manufacturer may exempt vehicles from the high-altitude emission standards as set forth in paragraph (d) of this section if the vehicles are not intended for sale at high altitude and if the vehicles fall within the definition of vehicles eligible for exemption. A vehicle shall be considered eligible for exemption if its design parameters [displacement-to-weight ratio (D/W) and engine speed-to-vehicle speed (N/V)] simultaneously fall within the exempted range for that manufacturer for that year. The exempted range is determined according to the following procedure:

(i) The manufacturer shall graphically display the D/W and N/V data of all vehicle configurations it will offer for the model year in question. The axis of the abscissa shall be D/W (where (D) is the engine displacement expressed in cubic centimeters and (W) is the equivalent vehicle test weight expressed in pounds), and the axis of the ordinate shall be N/V (where (N) is the crankshaft speed expressed in revolutions per minute and (V) is the vehicle speed expressed in miles per hour). At the manufacturer's option, either the 1:1 transmission gear ratio or the lowest numerical gear ratio available in the transmission will be used to determine N/V. The gear selection must be the same for all N/V data points on the manufacturer's graph. For each transmission/axle ratio combination, only

the lowest N/V value shall be used in the graphical display.

(ii) The product line is then defined by the equation, $N/V = C(D/W)^{-0.9}$, where the constant, (C), is determined by the requirement that all the vehicle data points either fall on the line or lie to the upper right of the line as displayed on the graphs.

(iii) The exemption line is then defined by the equation, $N/V = C(0.84\ D/W)^{-0.9}$, where the constant, (C), is the same as that found in paragraph (g)(2)(ii) of this section.

(iv) The exempted range includes all values of N/V and D/W which simultaneously fall to the lower left of the exemption line as drawn on the graph.

(3) The sale of a vehicle for principal use at a designated high-altitude location that has been exempted as set forth in paragraph (g)(2) of this section will be considered a violation of section 203(a)(1) of the Clean Air Act.

[45 FR 14504, Mar. 5, 1980, as amended at 45 FR 67002, Oct. 8, 1980; 46 FR 23055, Apr. 23, 1981; 47 FR 16183, Apr. 15, 1982; 47 FR 16335, Apr. 16, 1982]

§ 86.082-9 Emission standards for 1982 and later model year light-duty trucks.

(a)(1) The standards set forth in paragraphs (a) through (c) of this section shall apply for trucks sold for principle use at other than a designated high-altitude location. Exhaust emissions from 1982 and later model year light-duty trucks shall not exceed:

(i) *Hydrocarbons.* 1.7 grams per vehicle mile (1.06 grams per vehicle kilometer);

(ii) *Carbon monoxide.* 18 grams per vehicle mile (11.16 grams per vehicle kilometer);

(iii) *Oxides of nitrogen.* 2.3 grams per vehicle mile (1.43 grams per vehicle kilometer);

(iv) *Particulate emissions* (diesel only). 0.60 grams per vehicle mile (0.373 grams per vehicle kilometer).

(2) The standards set forth in paragraph (a)(1) of this section refer to the exhaust emitted over a driving schedule as set forth in Subpart B of this part and measured and calculated in accordance with those procedures.

(b)(1) Evaporative emissions from 1982 and later model year gasoline-fueled light-duty trucks shall not exceed:

(i) *Hydrocarbons.* 2.0 grams per test.

(2) The standard set forth in paragraph (b)(1) of this section refers to a composite sample of the evaporative emissions collected under the conditions set forth in Subpart B of this part and measured in accordance with those procedures.

(c) No crankcase emissions shall be discharged into the ambient atmosphere from any 1982 and later model year gasoline-fueled light-duty trucks.

(d)(1) Model year 1982 and later light-duty trucks sold for principal use at a designated high-altitude location shall be capable of meeting the following exhaust emission standards when tested under high-altitude conditions.

(i) *Hydrocarbons.* 2.0 grams per vehicle mile (1.24 grams per vehicle kilometer);

(ii) *Carbon monoxide.* 26 grams per vehicle mile (16.2 grams per vehicle kilometer);

(iii) *Oxides of nitrogen.* 2.3 grams per vehicle mile (1.43 grams per vehicle kilometer).

(2) The standards set forth in paragraph (d)(1) of this section refer to the exhaust emitted over a driving schedule as set forth in Subpart B of this part and measured and calculated in accordance with those procedures.

(e)(1) Fuel evaporative emissions from 1982 and later model year gasoline-fueled light-duty trucks sold for principal use at a designated high-altitude location shall not exceed 2.6 grams per test when tested under high-altitude conditions.

(2) The standard set forth in paragraph (e)(1) of this section refers to a composite sample of the fuel evaporative emissions collected under the conditions set forth in Subpart B of this part and measured in accordance with those procedures.

(f) No crankcase emissions shall be discharged into the ambient atmosphere from any 1982 and later model year gasoline-fueled light-duty trucks sold for principal use at a designated high-altitude location.

(g)(1) Any light-duty truck that a manufacturer wishes to certify for sale at low altitude must also be capable of

meeting high-altitude emission standards (specified in paragraphs (d) through (f) of this section). The manufacturer may specify vehicle adjustments or modifications to allow the vehicle to meet high-altitude standards but these adjustments or modifications may not alter the vehicle's basic engine, inertia weight class, transmission configuration, and axle ratio.

(i) A manufacturer may certify unique configurations to meet the high-altitude standards but is not required to certify these vehicle configurations to meet the low-altitude standards.

(ii) Any adjustments or modifications that are recommended to be performed on vehicles to satisfy the requirements of paragraph (g)(1) of this section:

(A) Shall be capable of being effectively performed by commercial repair facilities.

(B) Must be included in the manufacturer's application for certification.

(2) The manufacturer may exempt 1982 model year light-duty trucks from high-altitude emission standards as set forth in paragraph (d) of this section. No specific justification for the exemption need be included in the application for certification. The exemptions may include up to 30 percent of the manufacturer's projected light-duty truck sales for principal use at designated high-altitude locations for the 1982 model year. For this purpose, the sales percentage will be based on sales projections for individual vehicle configurations to be exempted. Exemptions will cover individual vehicle configurations, or groups of vehicle configurations, as specified by the manufacturer.

(3) The sale of a vehicle for principal use at a designated high-altitude location that has been exempted as set forth in paragraph (g)(2) of this section will *not* be considered a violation of Section 203(a)(1) of the Clean Air Act.

[45 FR 14505, Mar. 5, 1980, as amended at 45 FR 67003, Oct. 8, 1980; 46 FR 23055, Apr. 23, 1981]

§ 86.082-14 Small-volume manufacturers certification procedures.

(a) The small-volume manufacturers certification procedures described in paragraphs (b) and (c) of this section are optional. Small-volume manufacturers may use these optional procedures to demonstrate compliance with the general standards and specific emission requirements contained in this subpart.

(b)(1) The optional small-volume manufacturers certification procedures apply to light-duty vehicles, light-duty trucks, and heavy-duty engines produced by manufacturers with U.S. sales (for the model year in which certification is sought) of fewer than 10,000 units (LDV, LDT and HDE combined).

(2) For the purpose of determining the applicability of paragraph (b)(1) of this section, where there is more than one importer or distributor of vehicles and/or engines manufactured by the same person, the sales the Administrator shall use shall be the aggregate of the projected or actual sales of those vehicles and/or engines by all of the importers and distributors.

(c) Small-volume manufacturers shall demonstrate compliance with the applicable sections of this subpart as follows:

(1) Sections 86.082-1 through 86.082-11 of this subpart are applicable.

(2) Section 86.082-12 of this subpart is not applicable.

(3) Sections 86.082-13 through 86.082-20 of this subpart are applicable.

(4) Section 86.082-21. Small-volume manufacturers are covered by the following:

(i) The manufacturer shall include in its records all of the information that EPA requires in § 86.082-21 of this subpart. This information will be considered part of the manufacturer's application for certification. However, the manufacturer is not required to submit the information to the Administrator unless the Administrator requests it.

(5) Section 86.082-22 is applicable except as noted below.

(i) Small-volume light-duty vehicle and light-duty truck manufacturers

may satisfy the requirements of § 86.082–22(c) by including a statement of compliance on adjustable parameters in the application for certification. In the statement of compliance the manufacturer shall state that the limits, stops, seals, or other means used to inhibit adjustment have been designed to accomplish their intended purpose based on good engineering practice and past experience. If the vehicle parameter is adjustable the vehicle must meet emission standards with the parameter set any place within the adjustable range (Reference § 86.081–21).

(ii) Paragraphs (a), (b), (c), and (d) of § 86.082–22 are not applicable.

(6) Section 86.082–23 is applicable except that small-volume light-duty vehicle manufacturers may test emission-data vehicles at any service accumulation distance less than the 6,436-kilometer (4,000-mile) test point. Small-volume heavy-duty manufacturers may provide compliance emission data at less than 125 hours of operation instead of the 125-hour test point.

(7) Section 86.082–24 of this subpart is applicable except as noted below.

(i) Small-volume manufacturers may satisfy the requirements of paragraph (b) and (c) of § 86.082–24 by:

(A) Selecting emission-data test vehicles (engines) by the worst-case emissions criteria as follows:

(*1*) *Light-duty vehicles and light-duty trucks.* The test vehicle shall be selected based on the following criteria: The manufacturer shall select the heaviest (including options) vehicle within the family. Then within that vehicle it shall select, in the order listed, the largest frontal area, largest displacement, highest fuel flow per stroke at the speed of maximum rated torque and the highest numerical axle ratio with the largest tire offered in that engine family.

(*2*) *Heavy-duty gasoline fueled engines.* The manufacturer shall select the worst case emission-data engine first based on the largest displacement within the engine family. Then within the largest displacement the manufacturer shall select, in the order listed, highest fuel flow per stroke at the speed of maximum rated torque, the engine with the most advanced spark timing, no EGR or lowest EGR flow, and no air pump or lowest actual flow air pump.

(*3*) *Heavy-duty diesel engines.* The manufacturer shall select the worst case emission data engine based on the highest fuel feed per stroke, primarily at the speed of maximum rated torque and secondarily at rated speed.

(B) Using assigned deterioration factors that the Administrator determines and prescribes. However, the manufacturer may, at its option, accumulate miles (hours) on a durability-data vehicle (engine) and complete emission tests for the purpose of establishing its own deterioration factor.

(ii) Paragraphs (d) and (e) of § 86.082–24 are not applicable.

(8) Section 86.082–25 of this subpart is applicable to durability-data light-duty vehicles, light-duty trucks, and heavy-duty engines if the manufacturer does not use assigned deterioration factors.

(9) Sections 86.082–26 and 86.082–27 of this subpart are not applicable.

(10) Sections 86.082–28 and 86.082–29 of this subpart are applicable.

(11)(i) Section 86.082–30 of this subpart is applicable, except for paragraph (a)(2) and (b) of that section. In the place of these paragraphs, small-volume manufacturers shall comply with paragraphs (c)(11)(ii) through (11)(v) of this section, as shown below.

(ii) Small-volume manufacturers shall submit an application for certification containing the following:

(A) The names, addresses, and telephone numbers of the persons the manufacturer authorizes to communicate with us.

(B) A brief description of the vehicles (or engines) covered by the certificate (the manufacturers' sales data book or advertising, including specifications, may satisfy this requirement for most manufacturers). The description shall include, as a minimum, the following items as applicable:

(*1*) Engine families and vehicles (or engine) configurations

(*2*) Vehicle or engine models to be listed on the certificate of conformity

(*3*) The test weight and horsepower setting for each vehicle or engine configuration.

(4) Projected sales.
(5) Combustion cycle.
(6) Cooling mechanism.
(7) Number of cylinders.
(8) Displacement.
(9) Fuel system type.
(10) Number of catalytic converters, volume, and composition.
(11) Method of air aspiration.
(12) Thermal reactor characteristics.
(13) Suppliers' and/or manufacturer's name and model number of any emission related items of the above, items if purchased from a supplier who uses the items in its own certified vehicles(s) or engine(s).
(14) A List of emission component part numbers.
(15) Drawings, calibration curves, and descriptions of emission related components, including those components regulated under § 86.082-22(e) of this subpart, and schematics of hoses and other devices connecting these components.
(16) Vehicle adjustments or modifications necessary for light-duty vehicles and light-duty trucks, to assure that they conform to high-altitude standards.
(17) A description of the light-duty vehicles and 1982 model year light-duty trucks which are exempted from the high-altitude emission standards.
(C) The results of all emission tests the manufacturer performs.
(D)(1) The following statement signed by the authorized representative of the manufacturer: "The vehicles (or engines) described herein have been tested in accordance with the [list of the applicable subparts; A, B, D, or I] of Part 86, Title 40, United States Code of Federal Regulations, and on the basis of those tests are in conformance with that subpart. All of the data and records required by that subpart are on file and are available for inspection by the EPA Administrator. We project the total U.S. sales of vehicles (engines) subject to this subpart to be fewer than 10,000 units."
(2) A statement as required by and contained in § 86.081-14(c)(5) of this subpart signed by the authorized representative of the manufacturer.
(3) A statement that the vehicles or engines described in the manufacturers application for certification are not equipped with auxiliary emission control devices which can be classified as a defeat device as defined in § 86.082-2 of this subpart.
(4) A statement of compliance with section 206(a)(3) of the Clean Air Act.
(5) A statement that based on the manufacturers engineering evaluation and/or emission testing the vehicles sold for principle use at designated high-altitude locations comply with the high-altitude emission requirements and that all other vehicles are at least capable of being modified to meet high-altitude standards unless exempt under § 86.082-8(g)(2) and § 86.082-9(g)(2).
(iii) If the manufacturer meets requirements of this subpart, the Administrator will issue a certificate of conformity for the vehicles described in the application for certification.
(iv) The certificate will be issued for such a period not to exceed one model year as the Administrator may determine and upon such terms as he may deem necessary to assure that any new vehicle or engine covered by the certificate will meet the requirements of the Act and of this subpart. Each such certificate shall contain the following language:

"This certificate covers only those new motor vehicles (or new motor vehicle engines) which conform, in all material respects, to the design specifications that apply to those vehicles (or engines) described in the application for certification required by 40 CFR 86.082-14(c)(11)(ii), and the records required by 40 CFR 86.082-14(c) and which are produced during the ——— model year production period of the said manufacturer, as defined in 40 CFR 86.082-2."

"It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR §§ 86.078-7(c), and 86.606, and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate as specified in 40 CFR § 86.082-30(c), and (d). It is also a term of this certificate that this certificate may be revoked or suspended for the other reasons stated in § 86.082-30(c), and (d)."

(v)(A) If, after a review of the statements and descriptions submitted by the manufacturer, the Administrator determines that the manufacturer has

not met the applicable requirements, the Administrator shall notify the manufacturer in writing, setting forth the basis for his determination. The manufacturer may request a hearing on the Administrator's determination.

(B) If the manufacturer does not request a hearing or present the required information the Administrator will deny certification.

(12) Sections 86.082-31 through 86.082-32 of this subpart are not applicable.

(13) Section 86.082-33. Small-volume manufacturers are covered by the following:

(i) Small-volume manufacturers may make production changes (running changes) without receiving the Administrator's prior approval. The manufacturer shall assure (by conducting emission tests as it deems necessary) that the affected vehicles (engines) remain in compliance with the requirements of this part.

(ii) The manufacturer shall notify the Administrator within seven days after implementing any production related change (running change) that would affect vehicle emissions. This notification shall include any changes to the information required under paragraph (c)(11)(ii) of this section. The manufacturer shall also amend as necessary its records required under paragraph (c)(4) of this section to conform with the production design change.

(14) Section 86.082-34 of this subpart is not applicable.

(15) Sections 86.082-35 through 86.082-39 of this subpart are applicable.

[46 FR 16266, Mar. 12, 1981]

§ 86.082-21 Application for certification.

(a) A separate application for a certificate of conformity shall be made for each set of standards (except for high-altitude standards) and each class of new motor vehicle engines. Such application shall be made to the Administrator by the manufacturer and shall be updated and corrected by amendment.

(b) The application shall be in writing, signed by an authorized representative of the manufacturer, and shall include the following:

(1)(i) *All vehicles and engines.* Identification and description of the vehicles (or engines) covered by the application and a description of their engine (vehicles only), emission control system and fuel system components. This shall include a detailed description of each auxiliary emission control device (AECD) to be installed in or on any certification test vehicle (or certification test engine).

(ii) *Light-duty vehicles and light-duty trucks.* (A) The manufacturer shall provide to the administrator in the preliminary application for certification:

(*1*) A list of those parameters which are physically capable of being adjusted (including those adjustable parameters for which access is difficult) and that, if adjusted to settings other than the manufacturer's recommended setting, may affect emissions;

(*2*) A specification of the manufacturer's intended physically adjustable range of each such parameter, and the production tolerances of the limits or stops used to establish the physically adjustable range;

(*3*) A description of the limits or stops used to establish the manufacturer's intended physically adjustable range of each adjustable parameter, or any other means used to inhibit adjustment;

(*4*) The nominal or recommended setting, and the associated production tolerances, for each such paramater.

(B) The manufactuer may provide, in the preliminary application for certification, information relating to why certain parameters are not expected to be adjusted in actual use and to why the physical limits or stops used to establish the physically adjustable range of each parameter, or any other means used to inhibit adjustment, are expected to be effective in preventing adjustment of parameters on in-use vehicles to settings outside the manufacturer's intended physically adjustable ranges. This may include results of any tests to determine the difficulty of gaining access to an adjustment or exceeding a limit as intended or recommended by the manufacturer.

(C) The Administrator may require to be provided detailed drawings and descriptions of the various emission re-

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lated components, and/or hardware samples of such components, for the purpose of making his determination of which vehicle or engine parameters will be subject to adjustment for new certification and Selective Enforcement Audit testing and of the physically adjustable range for each such vehicle or engine parameter.

(2) Projected U.S. sales data sufficient to enable the Administrator to select a test fleet representative of the vehicles (or engines) for which certification is requested. The sales data shall also include the altitude of intended sale for light-duty vehicles and light-duty trucks.

(3) A description of the test equipment and fuel proposed to be used.

(4)(i) A description of the proposed mileage (or service) accumulation procedure for durability testing.

(ii) A description of the test procedures to be used to establish the evaporative emission deterioration factors required to be determined and supplied in § 86.079-23(a)(2).

(5)(i) A statement of recommended maintenance and procedures necessary to assure that the vehicles (or engines) covered by a certificate of conformity in operation conform to the regulations, and a description of the program for training of personnel for such maintenance, and the equipment required.

(ii) A description of vehicle adjustments or modifications necessary, if any, to assure that light-duty vehicles and light-duty trucks covered by a certificate of conformity, conform to the regulations while being operated at any altitude locations, and a statement of the altitude at which the adjustments or modifications apply.

(6) At the option of the manufacturer, the proposed composition of the emission-data test fleet or (where applicable) the durability-data test fleet.

(c) Complete copies of the application and of any amendments thereto, and all notifications under §§ 86.079-32, 86.079-33, and 86.079-34 shall be submitted in such multiple copies as the Administrator may require.

(d) Incomplete light-duty trucks shall have a maximum completed curb weight and maximum completed frontal area specified by the manufacturer.

[45 FR 67003, Oct. 8, 1980]

§ 86.082-22 Approval of application for certification; test fleet selections; determinations of parameters subject to adjustment for certification and Selective Enforcement Audit testing, adequacy of limits, and physically adjustable ranges.

(a) After a review of the application for certification and any other information which the Administrator may require, the Administrator may approve the application and select a test fleet in accordance with § 86.080-24.

(b) The Administrator may disapprove in whole or in part an application for certification for reasons including incompleteness, inaccuracy, inappropriate proposed mileage (or service) accumulation procedures, test equipment, or fuel, and incorporation of defeat devices in vehicles (or on engines) described by the application.

(c) Where any part of an application is rejected, the Administrator shall notify the manufacturer in writing and set forth the reasons for such rejection. Within 30 days following receipt of such notification, the manufacturer may request a hearing on the Administrator's determination. The request shall be in writing, signed by an authorized representative of the manufacturer and shall include a statement specifying the manufacturer's objections to the Administrator's determinations, and data in support of such objections. If, after the review of the request and supporting data, the Administrator finds that the request raises a substantial factual issue, he shall provide the manufacturer a hearing in accordance with § 86.078-6 with respect to such issue.

(d) The Administrator does not approve the test procedures for establishing the evaporative emission deterioration factors. The manufacturer shall submit the procedures as required in § 86.081-21(b)(4)(ii) prior to the Administrator's selection of the test fleet under § 86.080-24(b)(1) and if such procedures will involve testing of durability-data vehicles selected by the Administrator or elected by the

manufacturer under § 86.080-24(c)(1), prior to initiation of such testing.

(e) *Light-Duty vehicles and Light-Duty trucks only.* When the Administrator selects emission data vehicles for the test fleet, he will at the same time determine those vehicle or engine parameters which will be subject to adjustment during certification and Selective Enforcement Audit testing; the adequacy of the limits, stops, seals, or other means used to inhibit adjustment; and the resulting physically adjustable ranges for each such parameter and notify the manufacturer of his determinations.

(1)(i) The Administrator may determine to be subject to adjustment the idle fuel-air mixture, idle speed, and initial spark timing parameters on gasoline-fueled vehicles (carbureted or fuel injected); the choke valve action parameter(s) on carbureted, gasoline-fueled vehicles; or any parameter on any vehicle (Diesel or gasoline-fueled) which is physically capable of being adjusted, may significantly affect emissions, and was not present on the manufacturer's vehicles in the previous model year in the same form and function.

(ii) The Administrator may, in addition, determine to be subject to adjustment any other parameter on any vehicle which is physically capable of being adjusted and which may significantly affect emissions. However, the Administrator may do so only if he has previously notified the manufacturer that he might do so and has found, at the time he gave this notice, that the intervening period would be adequate to permit the development and application of the requisite technology, giving appropriate consideration to the cost of compliance within such period. In no event will this notification be given later than September 1 of the calendar year two years prior to the model year.

(iii) In determining the parameters subject to adjustment the Administrator will consider the likelihood that, for each of the parameters listed in paragraphs (e)(1)(i) and (e)(1)(ii) of this section, settings other than the manufacturer's recommended setting will occur on in-use vehicles. In determining likelihood, the Administrator will consider such factors as, but not limited to, information contained in the preliminary application, surveillance information from similar in-use vehicles, the difficulty and cost of gaining access to an adjustment, damage to the vehicle if an attempt is made to gain such access and the need to replace parts following such attempt, and the effect of settings other than the manufacturer's recommended setting on vehicle performance characteristics including emission characteristics.

(2)(i) The Administrator will determine a parameter to be adequately inaccessible or sealed if:

(A) In the case of an idle mixture screw, the screw is recessed within the carburetor casting and sealed with lead, thermosetting plastic, or an inverted elliptical spacer or sheared off after adjustment at the factory, and the inaccessibility is such that the screw cannot be accessed and/or adjusted with simple tools in one-half hour or for $20 (1978 dollars) or less.

(B) In the case of a choke bimetal spring, the plate covering the bimetal spring is riveted or welded in place, or held in place with nonreversible screws.

(C) In the case of a parameter which may be adjusted by elongating or bending adjustable members (e.g., the choke vacuum break), any elongation of the adjustable member is limited by design, or in the case of a bendable member, the member is constructed of a material which when bent would return to its original shape after the force is removed (plastic or spring steel materials).

(D) In the case of any parameter, the manufacturer demonstrates that adjusting the parameter to settings other than the manufacturer's recommended setting takes more than one-half hour or costs more than $20 (1978 dollars).

(ii) The Administrator will determine a physical limit or stop to be an adequate restraint on adjustability if:

(A) In the case of a threaded adjustment, the threads are terminated, pinned or crimped so as to prevent additional travel without breakage or need for repairs which take more than

one-half hour or cost more than $20 (1978 dollars).

(B) The adjustment is ineffective at the end of the limits of travel regardless of additional forces or torques applied to the adjustment.

(C) The manufacturer demonstrates that travel or rotation limits cannot be exceeded with the use of simple and inexpensive tools (e.g., screwdriver, pliers, open-end or box wrenches) without incurring significant and costly damage to the vehicle or control system or without taking more than one-half hour or costing more than $20 (1978 dollars).

(iii) If manufacturer service manuals or bulletins describe routine procedures for gaining access to a parameter or for removing or exceeding a physical limit, stop, seal or other means used to inhibit adjustment, or if surveillance data indicate that gaining access, removing, or exceeding is likely, paragraphs (e)(2)(i) and (e)(2)(ii) of this section shall not apply for that parameter.

(iv) In determining the adequacy of a physical limit, stop, seal, or other means used to inhibit adjustment of a parameter not covered by paragraph (e)(2)(i) or (e)(2)(ii) of this section, the Administrator will consider the likelihood that it will be circumvented, removed, or exceeded on in-use vehicles. In determining likelihood the Administrator will consider such factors as, but not limited to, information contained in the preliminary application; surveillance information from similar in-use vehicles; the difficulty and cost of circumventing, removing, or exceeding the limit, stop, seal, or other means; damage to the vehicle if an attempt is made to circumvent, remove, or exceed it and the need to replace parts following such attempt; and the effect of settings beyond the limit, stop, seal, or other means on vehicle performance characteristics other than emission characteristics.

(3) The Administrator shall determine two physically adjustable ranges for each parameter subject to adjustment.

(i)(A) In the case of a parameter determined to be adequately inaccessible or sealed, the Administrator may include within the physically adjustable range applicable to testing under §§ 86.079-23 and 86.081-29 (certification testing) all settings within the production tolerance associated with the nominal setting for that parameter, as specified by the manufacturer in the preliminary application for certification.

(B) In the case of other parameters, the Administrator shall include within this range all settings within physical limits or stops determined to be adequate restraints on adjustability. The Administrator may also include the production tolerances on the location of these limits or stops when determining the physically adjustable range.

(ii)(A) In the case of a parameter determined to be adequately inaccessible or sealed, the Administrator shall include within the physically adjustable range applicable to testing under § 86.608 (Selective Enforcement Audit testing) only the actual setting to which the parameter is adjusted during production.

(B) In the case of other parameters, the Administrator shall include within this range all settings within physical limits or stops determined to be adequate restraints on adjustability, as they are actually located and effective on the test vehicle.

(f) If the manufacturer submits the information specified in § 86.081-21(b)(1)(ii) in advance of its full preliminary application for certification, the Administrator shall review the information and make the determinations required in paragraph (e) of this section.

(g) Within 30 days following receipt of notification of the Administrator's determinations made under paragraph (e) of this section, the manufacturer may request a hearing on the Administrator's determinations. The request shall be in writing, signed by an authorized representative of the manufacturer, and shall include a statement specifying the manufacturer's objections to the Administrator's determinations, and data in support of such objections. If, after review of the request and supporting data, the Administrator finds that the request raises a substantial factual issue, he shall provide the manufacturer a hearing in ac-

cordance with § 86.078-6 with respect to such issue.

[44 FR 2973, Jan. 12, 1979, as amended at 45 FR 31721, May 14, 1980]

§ 86.082-23 Required data.

(a) The manufacturer shall perform the tests required by the applicable test procedures, and submit to the Administrator the following information: *Provided, however,* That if requested by the manufacturer, the Administrator may waive any requirement of this section for testing of vehicles (or engines) for which emission data are available, or will be made available, under the provisions of §86.081-29.

(b)(1) Exhaust emission durability data on such vehicles (or engines) tested in accordance with applicable test procedures and in such numbers as specified, which will show the performance of the systems installed on or incorporated in the vehicle (or engine) for extended mileage (or extended operation), as well as a record of all pertinent maintenance (all maintenance and servicing for heavy-duty engines) performed on the test vehicles (or test engines). Records of maintenance and servicing of heavy-duty engines performed prior to the zero-hour point do not need to be submitted but must be maintained.

(2) Evaporative emission deterioration factors for each evaporative emission family-evaporative emission control system combination and all test data that are derived from testing described under § 86.082-21(b)(4)(iii) designed and conducted in accordance with good engineering practice to assure that the vehicles covered by a certificate issued under § 86.082-30 will meet the evaporative emission standards in § 86.082-8 or § 86.082-9, as appropriate, for the useful life of the vehicle.

(c) Emission-data:

(1) *Certification vehicles.* (i) Emission data on such vehicles tested in accordance with applicable test procedures and in such numbers as specified. These data shall include zero-mile data, if generated, and emission data generated for certification as required under § 86.082-26(a)(3)(i) or § 86.082-26(a)(3)(ii).

(ii) Emission data on those vehicles selected under §§ 86.082-24(b)(1)(v) and 86.082-23(b)(1)(viii) and tested in accordance with the applicable test procedures of this subpart and in such numbers as specified, which are tested under high-altitude conditions after the vehicles emissions performance has stabilized. These data shall include zero mile data, if generated.

(2) *Certification engines.* Emission data on such engines tested in accordance with applicable emission test procedures, of this subpart and in such numbers as specified. These data shall include zero-hour data, if generated, and emission data generated for certification as required under § 86.082-26(b)(5).

(d) A statement that the vehicles (or engines) for which certification is requested conform to the requirements in § 86.081-5(b), and that the descriptions of tests performed to ascertain compliance with the general standards in § 86.081-5(b), and the data derived from such tests, are available to the Administrator upon request.

(e)(1) A statement that the test vehicles (or test engines) with respect to which data are submitted to demonstrate compliance with §§ 86.082-8, 86-082-9, 86-082-10, 86-082-11, as applicable, are in all material respects as described in the manufacturer's application for certification, have been tested in accordance with the applicable test procedures utilizing the fuels and equipment described in the application for certification and that on the basis of such tests, the vehicles (or engines) conform to the requirements of this part. If such statements cannot be made with respect to any vehicle (or engine) tested, the vehicle (or engine) shall be identified, and all pertinent data relating thereto shall be supplied to the Administrator. If, on the basis of the data supplied and any additional data as required by the Administrator, the Administrator determines that the test vehicle (or test engine) was not as described in the application for certification or was not tested in accordance with the applicable test procedures utilizing the fuels and equipment as described in the application for certification, the Administrator may make the determination that the

vehicle (or engine) does not meet the applicable standards. The provisions of § 86.083-30(b) shall then be followed.

(2) For evaporative emission durability, the statement of compliance with paragraph (b)(2) of this section.

[46 FR 50478, Oct. 13, 1981]

§ 86.082-24 Test vehicles and engines.

(a)(1) The vehicles or engines covered by an application for certification will be divided into groupings of engines which are expected to have similar emission characteristics throughout their useful life. Each group of engines with similar emission characteristics shall be defined as a separate engine family.

(2) To be classed in the same engine family, engines must be identical in all the following respects:

(i) The cylinder bore center-to-center dimensions.

(ii) [Reserved]

(iii) [Reserved]

(iv) The cylinder block configuration (air cooled or water cooled: L-6, 90°, V-8, etc.).

(v) The location of the intake and exhaust valves (or ports), and the valve (or port) sizes (within a ¼-inch range on the valve head diameter or within 10 percent of the port area.)

(vi) The method of air aspiration.

(vii) The combustion cycle.

(viii) Catalytic converter characteristics.

(ix) Thermal reactor characteristics.

(x) Type of air inlet cooler (e.g., intercoolers and aftercoolers) for diesel heavy-duty engines.

(3) Engines indentical in all the respects listed in paragraph (a)(2) of this section may be further divided into different engine families if the Administrator determines that they may be expected to have different emission characteristics. This determination will be based upon a consideration of the following features of each engine:

(i) The bore and stroke.

(ii) The surface-to-volume ratio of the nominally dimensioned cylinder at the top dead center positions.

(iii) The intake manifold induction port size and configuration.

(iv) The exhaust manifold port size and configuration.

(v) The intake and exhaust valve sizes.

(vi) The fuel system.

(vii) The camshaft timing and ignition or injection timing characteristics.

(4) Where engines are of a type which cannot be divided into engine families based upon the criteria listed in paragraphs (a)(2) and (a)(3) of this section, the Administrator will establish families for those engines based upon those features most related to their emission characteristics. Engines that are eligible to be included in the same engine family based on the criteria in paragraphs (a)(2) and (a)(3)(i) of this section may be further divided into different engine families if the manufacturer determines that they may be expected to have different emission characteristics. This determination will be based upon a consideration of the following features of each engine:

(i) The dimension from the center line of the crankshaft to the center line of the camshaft.

(ii) The dimension from the center line of the crankshaft to the top of the cylinder block head face.

(5) The gasoline-fueled vehicles covered by an application for certification will be divided into groupings which are expected to have similar evaporative emission characteristics throughout their useful life. Each group of vehicles with similar evaporative emission characteristics shall be defined as a separate evaporative emission family.

(6) To be classed in the same evaporative emission family, vehicles must be similar with respect to:

(i) Type of vapor storage device (e.g., canister air cleaner, crankcase).

(ii) Basic canister design.

(iii) Fuel system.

(7) Where vehicles are of a type which cannot be divided into evaporative emission families based on the criteria listed above, the Administrator will establish families for those vehicles based upon the features most related to their evaporative emission characteristics.

(8)(i) If the manufacturer elects to participate in the Alternative Durability Program, the engine families cov-

cred by an application for certification shall be grouped based upon similar engine design and emission control system characteristics. Each of these groups shall constitute a separate engine family group.

(ii) To be classed in the same engine family group, engine families must contain engines identical in all of the following respects:

(A) The combustion cycle.

(B) The cylinder block configuration (air-cooled or water-cooled; L-6, V-8, rotary, etc.).

(C) Displacement (engines of different displacement with 50 cubic inches or 15 percent of the largest displacement and contained within a multidisplacement engine family will be included in the same engine family group).

(D) Catalytic converter usage and basic type (non-catalyst, oxidation catalyst only, three-way catalyst equipped).

(9) Engine families identical in all respects listed in paragraph (a)(8) of this section may be further divided into different engine family groups if the Administrator determines that they are expected to have significantly different exhaust emission control system deterioration characteristics.

(10) A manufacturer may request the Administrator to include in an engine family group, engine families in addition to those grouped under the provisions of paragraph (a)(8) of this section. This request must be accompanied by information the manufacturer believes supports the inclusion of these additional engine families.

(11) A manufacturer may combine into a single engine family group those light-duty vehicle and light-duty truck engine families which otherwise meet the requirements of paragraphs (a)(8) through (a)(10) of this section.

(b) Emission data:

(1) *Emission-data vehicles.* Paragraph (b)(1) of this section applies to light-duty vehicle and light-duty truck emission-data vehicles.

(i) Vehicles will be chosen to be operated and tested for emission data based upon engine family groupings. Within each engine family, one test vehicle will be selected based on the following criteria: The Administrator shall select the vehicle with the heaviest equivalent test weight (including options) within the family. Then within that vehicle the Administrator shall select, in the order listed, the highest road load power, largest displacement, highest fuel flow at the speed of maximum rated torque, the transmission with the highest numerical final gear ratio (including overdrive), and the highest numerical axle ratio offered in that engine family.

(ii) The Administrator shall select one additional test vehicle from within each engine family. The vehicle selected shall be the vehicle expected to exhibit the highest emissions of those vehicles remaining in the engine family. If all vehicles within the engine family are similar the Administrator may waive the requirements of this paragraph.

(iii) Within an engine family and exhaust emission control system, the manufacturer may alter any emission-data vehicle to represent more than one selection under paragraph (b)(1)(i), (ii), (iv), or (vii) of this section.

(iv) If the vehicles selected in accordance with paragraphs (b)(1)(i) and (ii) of this section do not represent each engine-system combination, then one vehicle of each engine-system combination not represented will be selected by the Administrator. The vehicle selected shall be the vehicle expected to exhibit the highest emissions of those vehicles within the engine family.

(v) For high-altitude exhaust emission compliance for each engine family, the manufacturer shall follow one of the following procedures:

(A) The manufacturer will select for testing under high-altitude conditions the worst-case vehicle configuration from the nonexempt vehicles selected in accordance with § 86.082-24(b)(1)(ii), (iii), and (iv) of this section or,

(B) In lieu of testing vehicles according to paragraph (b)(1)(v)(A) of this section, a manufacturer may provide a statement in its application for certification that, based on the manufacturer's engineering evaluation of such high-altitude emission testing as the manufacturer deems appropriate,

(*1*) The vehicles sold for principal use at designated high-altitude locations comply with the high-altitude emission requirements and,

(*2*) That all other vehicles sold at low altitude and not exempt under § 86.082-8(g)(2) and § 86.082-9(g)(2) are capable of being modified to meet high-altitude standards.

(vi) [Reserved]

(vii)(A) Vehicles of each evaporative emission family will be divided into evaporative emission control systems.

(B) The Administrator will select the vehicle expected to exhibit the highest evaporative emissions, from within each evaporative family to be certified, from among the vehicles represented by the exhaust emission-data selections for the engine family, unless evaporative testing has already been completed on the vehicle expected to exhibit the highest evaporative emissions for the evaporative family as part of another engine family's testing.

(C) If the vehicles selected in accordance with paragraph (b)(1)(vii)(B) of this section do not represent each evaporative emission control system, the Administrator will select the vehicle with the highest expected evaporative emissions from within each unrepresented evaporative system.

(viii) For high-altitude evaporative emission compliance for each evaporative emission family, the manufacturer shall follow one of the following procedures:

(A) The manufacturer will select for testing under high-altitude conditions the one nonexempt vehicle previously selected under paragraphs (b)(1)(vii)(A) or (B) of this section which is expected to have the highest level of evaporative emissions when operated at high altitude, or

(B) In lieu of testing vehicles according to paragraph (b)(1)(viii)(A) of this section, a manufacturer may provide a statement in its application for certification that, based on the manufacturer's engineering evaluation of such high-altitude emission testing as the manufacturer deems appropriate,

(*1*) The vehicles sold for principal use at designated high-altitude locations comply with the high-altitude emission requirements and,

(*2*) That all other vehicles sold at low altitude and not exempt under § 86.082-8(g)(2) and § 86.082-9(g)(2) are capable of being modified to meet high-altitude standards.

(ix) Vehicles selected under paragraph (b)(1)(v)(A) of this section may be used to satisfy the requirements of (b)(1)(viii)(A) of this section.

(x)(A) The manufacturer may reconfigure any of the low-altitude emission-data vehicles to represent the vehicle configuration required to be tested at high altitude.

(B) The manufacturer is not required to test the reconfigured vehicle at low altitude.

(2) *Gasoline-fueled heavy-duty emission-data engines.* Paragraph (b)(2) of this section applies to gasoline-fueled heavy-duty engines.

(i) Engines will be chosen to be run for emission data based upon engine family groupings. Within each engine family, the requirements of this paragraph must be met.

(ii) [Reserved]

(iii) The Administrator shall select a maximum of two engines within each engine family based upon features indicating that they may have the highest emission levels of the engines in that engine family as follows:

(A) The Administrator shall select one emission-data engine first based on the largest displacement within the engine family. Then within the largest displacement the Administrator shall select, in the order listed, highest fuel flow at the speed of maximum rated torque, the engine with the most advanced spark timing, no EGR or lowest EGR flow, and no air pump or lowest actual flow air pump.

(B) The Administrator shall select one additional engine, from within each engine family. The engine selected shall be the engine expected to exhibit the highest emissions of those engines remaining in the engine family. If all engines within the engine family are similar the Administrator may waive the requirements of this paragraph.

(iv) If the engines selected in accordance with paragraph (b)(2)(ii) and (iii) of this section do not represent each engine displacement-exhaust emission control system combination, then one

engine of each engine displacement-exhaust emission control system combination not represented shall be selected by the Administrator.

(v) Within an engine family and emission control system, the manufacturer may alter any emission-data engine to represent more than one selection under paragraphs (b)(2) (iii) and (iv) of this section.

(3) *Diesel heavy-duty emission-data engines.* Paragraph (b)(3) of this section applies to diesel heavy-duty emission-data engines.

(i) Engines will be chosen to be run for emission data based upon engine family groupings. Within each engine family, the requirements of this paragraph must be met.

(ii) Engines of each engine family will be divided into groups based upon their exhaust emission control systems. One engine of each engine system combination shall be run for smoke emission data and gaseous emission data. Either the complete gaseous emission test or the complete smoke test may be conducted first. Within each combination, the engine that features the highest fuel feed per stroke, primarily at the speed of maximum rated torque and secondarily at rated speed, will usually be selected. If there are military engines with higher fuel rates than other engines in the same engine system combinations, then one military engine shall also be selected. The engine with the highest fuel feed per stroke will usually be selected.

(iii) The Administrator may select a maximum of one additional engine within each engine-system combination based upon features indicating that it may have the highest emission levels of the engines of that combination. In selecting this engine, the Administrator will consider such features as the injection system, fuel system, compression ratio, rated speed, rated horsepower, peak torque speed, and peak torque.

(c) Durability data:

(1) *Durability-data vehicles.* Paragraph (c)(1) of this section applies to light-duty vehicle and light-duty truck durability-data vehicles, except for the production durability-data vehicles selected for the Alternative Durability Program according to paragraph (h)(1) of this section.

(i) A durability-data vehicle will be selected by the Administrator to represent each engine-system combination. The vehicle selected shall be of the engine displacement with the largest projected sales volume of vehicles with that control-system combination in that engine family and will be designated by the Administrator as to transmission type, fuel system, inertia weight class, and test weight.

(ii) A manufacturer may elect to operate and test additional vehicles to represent any engine-system combination. The additional vehicles must be of the same engine displacement, transmission type, fuel system and inertia weight class as the vehicle selected for that engine-system combination in accordance with the provisions of paragraph (c)(1)(i) of this section. Notice of an intent to operate and test additional vehicles shall be given to the Administrator no later than 30 days following notification of the test fleet selection.

(2) *Gasoline-fueled heavy-duty durability-data engines.* Paragraph (c)(2) of this section applies to gasoline-fueled heavy-duty durability-data engines.

(i) A durability-data engine will be selected by the Administrator to represent each engine-system combination.

(ii) [Reserved]

(iii) A manufacturer may elect to operate and test additional engines to represent any engine-system combination. The additional engines must be of the same engine displacement and fuel system as the engine selected for that combination in accordance with the provisions of paragraph (c)(2)(i) of this section. Notice of an intent to run additional engines shall be given to the Administrator no later than 30 days following notification of the test fleet selection. Deterioration factors calculated for each engine-system combination shall be applied separately to military and nonmilitary engines within the same engine-system combination.

(3) *Diesel heavy-duty durability-data engines.* Paragraph (c)(3) of this sec-

tion applies to diesel heavy-duty durability data engines.

(i) One engine from each engine-system combination shall be tested as prescribed in § 86.082-26(b)(6). At each test point, either the complete gaseous emission test or the complete smoke test may be conducted first. Within each combination, the engine which features the highest fuel feed per stroke, primarily at rated speed and secondarily at the speed of maximum rated torque, will usually be selected for durability testing. In the case where more than one engine in an engine-system combination has the highest fuel feed per stroke, the engine with the highest maximum rated horsepower will usually be selected for durability testing. If an engine-system combination includes both military and nonmilitary engines, then the nonmilitary engine with the highest maximum rated horsepower will usually be selected for durability testing.

(ii) A manufacturer may elect to operate and test additional engines to represent any engine-system combination. The additional engines must be of the same model and fuel system as the engine selected in accordance with the provisions of paragraph (c)(3)(i) of this section. Notice of intent to test additional engines shall be given to the Administrator no later than 30 days following notification of the test fleet selection. Deterioration factors calculated for each engine-system combination shall be applied separately to military and nonmilitary engines within the same engine-system combination.

(d) For purposes of testing under § 86.082-26(a)(9) or (b)(11), the Administrator may require additional emission-data vehicles (or emission-data engines) and durability-data vehicles (or durability-data engines) identical in all material respects to vehicles (or engines) selected in accordance with paragraphs (b) and (c) of this section, *provided* that the number of vehicles selected shall not increase the size of either the emission-data fleet or the durability-data fleet by more than 20 percent or one vehicle, whichever is greater.

(e)(1) Any manufacturer whose projected sales for the model year in which certification is sought is less than:

(i) 2,000 gasoline-fueled light-duty vehicles, or

(ii) 2,000 diesel light-duty vehicles, or

(iii) 2,000 gasoline-fueled light-duty trucks, or

(iv) 2,000 diesel light-duty trucks, or

(v) 2,000 gasoline-fueled heavy-duty engines, or

(vi) 2,000 diesel heavy-duty engines, may request a reduction in the number of test vehicles (or engines) determined in accordance with the foregoing provisions of this section. The Administrator may agree to such lesser number as he determines would meet the objectives of this procedure.

(2) Any manufacturer may request to certify engine families with combined total sales of fewer than 10,000 light-duty vehicles, light-duty trucks, and heavy-duty engines utilizing assigned deterioration factors prescribed by the Administrator. The assigned deterioration factors shall be applied only to entire engine families.

(f)(1) In lieu of testing an emission-data or durability-data vehicle (or engine) selected under paragraph (b) or (c) of this section, and submitting data therefor, a manufacturer may, with the prior written approval of the Administrator, submit exhaust emission data and/or fuel evaporative emission data, as applicable, on a similar vehicle (or engine) for which certification has previously been obtained or for which all applicable data required under § 86.082-23 have previously been submitted.

(2) Heavy-duty engine test data submitted prior to the 1980 model year and which comply with paragraph (f)(1) of this section can be used in subsequent model years, without regard to the test procedure. Any heavy-duty engine certified in the 1979 model year will be certified for 1980 and subsequent model years if requested by the manufacturer.

(g)(1) This paragraph applies to light-duty vehicles and light-duty trucks, but does not apply to the production vehicles selected under paragraph (h) of this section.

(2) Where it is expected that more than 33 percent of the vehicles in an engine family will be equipped with an optional item, the full estimated weight of that item shall be included, if required by the Administrator, in the curb weight computation for each vehicle available with that option in the engine family. Where it is expected that 33 percent or less of the vehicles in an engine family will be equipped with an item of optional equipment, no weight for that item will be added in computing curb weight. In the case of mutually exclusive options, only the weight of the heavier option will be added in computing curb weight. Optional equipment weighing less than 3 pounds per item need not be considered.

(3)(i) Where it is expected that more than 33 percent of a car line, within an engine-system combination, will be equipped with an item of optional equipment that can reasonably be expected to influence emissions, then such items shall actually be installed (unless excluded under paragraph (g)(3)(ii) of this section) on all emission-data and durability-data vehicles of that car line, within that engine-system combination, on which the items are intended to be offered in production. Optional equipment that can reasonably be expected to influence emissions are the air conditioner, power steering, power brakes and other items determined by the Administrator.

(ii) If the manufacturer determines by test data or engineering evaluation that the actual installation of the optional equipment required by paragraph (g)(3)(i) of this section does not affect the emissions or fuel economy values, the optional equipment need not be installed on the test vehicle. The weight of the options shall be included in the design curb weight and also be represented in the weight of the test vehicles. The engineering evaluation, including any test data, used to support the deletion of optional equipment from test vehicles, shall be maintained by the manufacturer and shall be made available to the Administrator upon request.

(4) Optional equipment that can reasonably be expected to influence emissions which is utilized on 33 percent or less of the vehicles in the engine family shall not be installed on any vehicle in that engine family unless specifically required under this section.

(h) *Alternative Durability Program durability-data vehicles.* Paragraph (h) of this section applies to light-duty vehicle and light-duty truck durability-data vehicles selected under the Alternative Durability Program. The Alternative Durability Program is described in § 86.081-13.

(1) In order to update the durability data to be used to determine a deterioration factor for each engine family group, the Administrator will select durability-data vehicles from the manufacturer's production line. Production vehicles will be selected from the 1981, 1982, and 1983 model year production of vehicles.

(i) The Administrator shall select the production durability-data vehicle designs from the designs that the manufacturer offers for sale. For each model year and for each engine family group, the Administrator may select production durability-data vehicle designs of equal number to the number of engine families within the engine family group, up to a maximum of three vehicles.

(ii) The production durability-data vehicles representing the designs selected in paragraph (h)(1)(i) of this section will be randomly selected from the manufacturer's production. The Administrator will make these random selections unless the manufacturer (with prior approval of the Administrator) elects to make the random selections.

(iii) The manufacturer may select additional production durability-data vehicle designs from within the engine family group. The production durability-data vehicles representing these designs shall be randomly selected from the manufacturer's production in accordance with paragraph (h)(1)(ii) of this section.

(iv) For each production durability-data vehicle selected under paragraph (h)(1) of this section, the manufacturer shall provide to the Administrator (before the vehicle is tested or begins service accumulation) the vehicle identification number. Before the vehicle

begins service accumulation the manufacturer shall also provide the Administrator with a description of the durability-data vehicle as specified by the Administrator.

(2) If, within an existing engine family group, a manufacturer requests to certify vehicles of a new design, engine family, emission control system, or with any other durability-related design difference, the Administrator will determine if the existing engine family group deterioration factor is appropriate for the new design. If the Administrator cannot make this determination or deems the deterioration factor not appropriate, the Administrator shall select preproduction durability-data vehicles under the provisions of paragraph (c) of this section. If vehicles are then certified using the new design, the Administrator may select production vehicles with the new design under the provisions of paragraph (h)(1) of this section.

(3) If a manufacturer requests to certify vehicles of a new design that the Administrator determines are a new engine family group, the Administrator shall select preproduction durability-data vehicles under the provisions of paragraph (c) of this section. If vehicles are then certified using the new design, the Administrator may select production vehicles of that design under the provisions of paragraph (h)(1) of this section.

[45 FR 67004, Oct. 8, 1980, as amended at 46 FR 23056, Apr. 23, 1981; 46 FR 50478, Oct. 13, 1981]

§ 86.082-25 Maintenance.

(a) *Light-duty vehicles and light-duty trucks.* Paragraph (a) of this section applies to light-duty vehicles and light-duty trucks.

(1) Scheduled maintenance on the engine, emission control system, and fuel system of durability-data vehicles, selected by the Administrator or elected by the manufacturer under § 86.082-24(c)(1), shall be scheduled for performance during durability testing at the same mileage intervals that will be specified in the manufacturer's maintenance instructions furnished to the ultimate purchaser of the motor vehicle. This maintenance schedule may be updated as necessary throughout the durability-data vehicle's testing provided that no maintenance operation is deleted from the maintenance schedule after the operation has been performed on the test vehicle. Such maintenance shall be performed, except as provided in paragraph (a)(5)(iii) of this section, only under the following provisions:

(i) Scheduled major engine tuneups to manufacturer's specifications may be performed no more frequently than every 12,500 miles of scheduled driving: *Provided*, That no tuneup may be performed after 45,000 miles of scheduled driving. A scheduled major engine tuneup shall be restricted to paragraph (a)(1)(i) (A) or (B) of this section, and shall be conducted in a manner consistent with service instructions and specifications provided by the manufacturer for use by customer service personnel.

(A) *For gasoline-fueled vehicles*, the following items may be inspected, replaced, cleaned, adjusted, and/or serviced as required:

(*1*) Ignition system.

(*2*) Cold starting enrichment system (includes fast idle speed setting).

(*3*) Curb idle speed and air/fuel mixture.

(*4*) Drive belt tension on engine accessories.

(*5*) Valve lash.

(*6*) Inlet air and exhaust gas control valves.

(*7*) Engine bolt torque.

(*8*) Spark plugs.

(*9*) Fuel filter and air filter.

(*10*) Crankcase emission control system.

(*11*) Fuel evaporative emission control system.

(B) *For diesel vehicles*, a major engine tuneup shall be restricted to the following:

(*1*) Adjust low idle speed.

(*2*) Adjust valve lash if required.

(*3*) Adjust injector timing.

(*4*) Adjust governor.

(*5*) Clean and service injector tips.

(*6*) Adjust drive belt tension on engine accessories.

(*7*) Check engine bolt torque and tighten as required.

(ii) Change of engine and transmission oil, and change or service of oil

filter will be allowed at the same mileage intervals that will be specified in the manufacturer's maintenance instructions.

(iii) Readjustment of the engine idle speed (curb idle and fast idle) may be performed, in addition to adjustment during scheduled major engine tuneups, once during the first 5,000 miles of vehicle operation.

(2)(i) *For gasoline-fueled vehicles,* unscheduled maintenance on the engine, emission control system, and fuel system of durability-data vehicles may be performed, except as provided in paragraph (a)(5)(i) of this section, only under the following provisions:

(A) Any persistently misfiring spark plug may be replaced, in addition to replacement at scheduled major engine tuneup points.

(B) Readjustment of the engine cold starting enrichment system may be performed if there is a problem of stalling or if there is visible black smoke.

(C) Readjustment of the engine idle speed (curb idle and fast idle) may be performed, in addition to that performed as scheduled maintenance under paragraph (a)(1) of this section, if the idle speed exceeds the manufacturer's recommended idle speed by 300 rpm or more, or if there is a problem of stalling.

(D) The idle mixture may be reset, other than during scheduled major engine tuneups, only with the advance approval of the Administrator.

(ii) *For diesel vehicles,* unscheduled maintenance on the engine emission control system, and fuel system of durability-data vehicles may be performed except as provided in paragraph (a)(5)(i) of this section, only under the following provisions:

(A) Injectors may be changed if a persistent misfire is detected.

(B) Readjustment of the engine idle speed (curb idle and fast idle) may be performed in addition to that performed as scheduled maintenance under paragraph (a)(1) of this section, if the idle speed exceeds the manufacturer's recommended idle speed by 300 rpm or more, or if there is a problem of stalling.

(3) An exhaust gas recirculation (EGR) system may be serviced during durability testing only under one of the following provisions:

(i) Manufacturers may schedule service to the EGR system at the scheduled major engine tuneup, if an audible and/or visual signal approved by the Administrator alerts the vehicle operator to the need for EGR system maintenance at each of those mileage points. One additional servicing may also be performed as unscheduled maintenance if there is an overt indication of malfunction and if the malfunction or repair of the malfunction does not render the test vehicle unrepresentative of vehicles in use.

(ii) Manufacturers may service the EGR system as unscheduled maintenance a maximum of three times during the 50,000 miles if failure of the EGR system activates an audible and/or visual signal approved by the Administrator which alerts the vehicle operator to the need for EGR system maintenance. One additional servicing may also be performed as unscheduled maintenance if there is an overt indication of malfunction and if the malfunction or repair of the malfunction does not render the test vehicle unrepresentative of vehicles in use.

(iii) Manufacturers may service the EGR system a maximum of three times during the 50,000 miles either at a scheduled major engine tuneup point or as unscheduled maintenance, if an audible and/or visual signal approved by the Administrator alerts the vehicle operator to the need for EGR system maintenance. The signal may be activated either by the EGR system failure (unscheduled maintenance) or need for scheduled periodic maintenance. If maintenance is performed, the signal for scheduled periodic maintenance shall be reset. One additional servicing may also be performed as unscheduled maintenance if there is an overt indication of malfunction and if the malfunction or repair of the malfunction does not render the test vehicle unrepresentative of vehicles in use.

(iv) Manufacturers may schedule service to the EGR system at the scheduled major engine tuneup(s) if failure to perform EGR system maintenance is not likely, as determined by the Administrator, to result in an improvement in vehicle performance.

One additional servicing may also be performed as unscheduled maintenance if there is an overt indication of malfunction and if the malfunction or repair of the malfunction does not render the test vehicle unrepresentative of vehicles in use.

(4) The catalytic converter may be serviced once during 50,000 miles if an audible and/or visual signal approved by the Administrator alerts the vehicle operator to the need for maintenance. The signal may be activated either by component failure or need for maintenance at a scheduled point.

(5) Any other engine, emission control system, or fuel system adjustment, repair, removal, disassembly, cleaning, or replacement on durability-data vehicles shall be performed only with the advance approval of the Administrator.

(i) In the case of unscheduled maintenance, such approval will be given if the Administrator:

(A) Has made a preliminary determination that part failure or system malfunction, or the repair of such failure or malfunction, does not render the vehicle unrepresentative of vehicles in use, and does not require direct access to the combustion chamber, except for spark plug, fuel injection component, or removable prechamber removal or replacement; and

(B) Had made a determination that the need for maintenance or repairs is indicated by an overt indication of malfunction such as persistent misfiring, vehicle stalling, overheating, fluid leakage, loss of oil pressure, or charge indicator warning. For the evaporative emission control system, this overt indication may be indicated by such items as fuel odor or fluid leakage.

(ii) Emission measurements may not be used as a means of determining the need for unscheduled maintenance under paragraph (a)(5)(i)(A) of this section.

(iii) Requests for authorization of scheduled maintenance of emission control-related components not specifically authorized to be maintained by these regulations must be made prior to the beginning of durability testing. The Administrator will approve the performance of such maintenance if the manufacturer makes a satisfactory showing that the maintenance will be performed on vehicles in use.

(6) If the Administrator determines that part failure or system malfunction occurrence and/or repair rendered the vehicle unrepresentative of vehicles in use, the vehicle shall not be used as a durability-data vehicle.

(7) Where the Administrator agrees under § 86.082-26 to a mileage accumulation of less than 50,000 miles for durability testing, he may modify the requirements of this paragraph.

(8)(i) Adjustment of engine idle speed on emission-data vehicles may be performed once before the 6,436-kilometer (4,000-mile) test point. Any other engine, emission control system, or fuel system adjustment, repair, removal, disassembly, cleaning, or replacement on emission-data vehicles shall be performed only with the advance approval of the Administrator.

(ii) Maintenance on emission-data vehicles selected under § 86.082-24(b)(1)(v) or (b)(1)(viii) and permitted to be tested for purposes of § 86.082-23(b)(1) (i) and (ii) under the provisions of § 86.082-24(b)(1)(vi) may be performed in conjunction with emission control system modifications at the 6,436-kilometer (4,000-mile) test point, and shall be performed in accordance with the maintenance instructions to be provided to the ultimate purchaser required under § 86.079-38.

(iii) Maintenance on those emission-data vehicles selected under § 86.082-24(b)(1)(v) which are not capable of being modified in the field for the purpose of complying with emission standards at an altitude other than intended by the original design may be performed in conjunction with the emission control system modifications at the 6,436-kilometer (4,000-mile) test point, and shall be approved in advance by the Administrator.

(9) Repairs to vehicle components of the durability-data or emission-data vehicle, other than the engine, emission control system, or fuel system, shall be performed only as a result of part failure, vehicle system malfunction, or with the advance approval of the Administrator.

(10) Complete emission tests (see §§ 86.106 through 86.145) are required, unless waived by the Administrator, before and after any vehicle maintenance which may reasonably be expected to affect emissions. These test data may be submitted weekly to the Administrator, but shall be air posted or delivered within 7 days after completion of the tests, along with a complete record of all pertinent maintenance, including a preliminary engineering report of any malfunction diagnosis and the corrective action taken. A complete engineering report shall be delivered or air posted to the Administrator within 30 working days after the tests. In addition, all test data and maintenance reports shall be compiled and provided to the Administrator in accordance with § 86.082-23.

(11) The Administrator shall be given the opportunity to verify the existence of an overt indication of part failure and/or vehicle malfunction (e.g., misfiring, stalling, black smoke), or an activation of an audible and/or visual signal, prior to the performance of any maintenance to which such overt indication or signal is relevant under the provisions of this section.

(12) Equipment, instruments, or tools may not be used to identify malfunctioning, maladjusted, or defective engine components unless the same or equivalent equipment, instruments, or tools will be available to dealerships and other service outlets and;

(i) Are used in conjunction with scheduled maintenance on such components.

(ii) Are used subsequent to the identification of a vehicle or engine malfunction, as provided in paragraph (a)(5)(i) of this section for durability-data vehicles or paragraph (a)(8)(i) of this section for emission-data vehicles, or

(iii) Unless specifically authorized by the Administrator.

(b) [Reserved]

(c)(1) *Heavy-duty engines.* Paragraph (c) of this section applies to heavy-duty engines.

(2)(i) The scheduled maintenance described in this section may be performed on a durability-data engine provided the maintenance is requested in the application for certification. Such scheduled maintenance must be specified at the same intervals in the maintenance instructions furnished to the ultimate purchaser of the vehicle in which the engine, represented by the test engine, is installed. (For equivalent dynamometer hours, engine hours, and mileage intervals, see § 86.082-2.) A scheduled major engine servicing shall be restricted to items listed in this subparagraph and shall be conducted in a manner consistent with service instructions and specifications provided by the manufacturer for use by the customer service personnel.

(A) For gasoline-fueled engines, major engine tuneups to manufacturer's specifications may be performed no more frequently than every 375 hours of scheduled dynamometer operation: *Provided*, no tuneups are performed after 1,375 hours of scheduled dynamometer operation. The following items may be inspected, replaced, cleaned, adjusted, and/or serviced as required:

(*1*) Ignition system

(*2*) Cold starting enrichment system (includes fast idle speed setting).

(*3*) Curb idle speed and air/fuel mixture.

(*4*) Drive belt tension on engine accessories.

(*5*) Valve lash.

(*6*) Inlet air and exhaust gas control valves.

(*7*) Engine bolt torque.

(*8*) Spark plugs.

(*9*) Fuel filter and air filter.

(*10*) Crankcase emission control system.

(*11*) Fuel evaporative emission control system.

(B) For diesel engines one major engine servicing to the manufacturer's specifications may be performed prior to 875 hours (±8 hours) of scheduled dynamometer operation. The following items may be inspected, replaced, cleaned, adjusted, and/or serviced as required:

(*1*) Low idle speed.

(*2*) Drive belt tension.

(*3*) Engine bolt torque.

(*4*) Valve lash.

(*5*) Injection timing.

(*6*) Injector assemblies.

(*7*) Governor settings.

(C) Normal engine servicing such as engine oil change, and oil filter, fuel filter, and air filter cleaning or replacement will be allowed at manufacturer's recommended intervals. If approved in advance by the Administrator, the maintenance for these items may differ from that specified in the manufacturer's maintenance instructions.

(D) Readjustment of the engine low idle speed may be performed once during the first 125 hours of engine operation.

(ii) Unscheduled maintenance may be performed on durability-data engines, except as provided in paragraph (c)(2)(v)(A) of this section, only under the following provisions:

(A) An injector or spark plug may be changed if a persistent misfire is detected.

(B) Readjustment of a gasoline-fueled engine cold-start enrichment system may be performed if there is a problem of stalling or if there is visible black smoke.

(C) Readjustment of the engine idle speed (curb idle and fast idle) may be performed, in addition to that performed as scheduled maintenance under paragraph (c)(2)(i) of this section, if the idle speed exceeds the manufacturer's recommended idle speed by 300 rpm or more, or if there is a problem of stalling.

(D) The idle mixture may be reset, other than during scheduled major engine tuneups, only with the advance approval of the Administrator.

(iii) Any exhaust gas recirculation (EGR) system may be serviced during durability testing only under one of the following provisions:

(A) Manufacturers may schedule service to the EGR system at the scheduled major engine tuneup if an audible and/or visual signal approved by the Administrator alerts the engine operator to the need for EGR system maintenance at the service point. One additional servicing may also be performed as unscheduled maintenance if there is an overt indication of malfunction and if the malfunction or repair of the malfunction does not render the test engine unrepresentative of engines in use.

(B) Manufacturers may service the EGR system as unscheduled maintenance a maximum of one time during durability testing (1,500 hours for gasoline-fueled engines or 1,000 hours for diesel engines) if failure of the EGR system activates an audible and/or visual signal approved by the Administrator which alerts the engine operator to the need for EGR system maintenance. One additional servicing may also be performed as unscheduled maintenance if there is an overt indication of malfunction and if the malfunction or repair of the malfunction does not render the test engine unrepresentative of engines in use.

(C) Manufacturers may service the EGR system a maximum of three times during durability testing (1,500 hours for gasoline-fueled engines or 1,000 hours for diesel engines) either at a scheduled major engine tuneup point or as unscheduled maintenance, if an audible and/or visual signal approved by the Administrator alerts the engine operator to the need for EGR system maintenance. The signal may be activated either by EGR system failure (unscheduled maintenance) or need for scheduled periodic maintenance. If maintenance is performed, the signal for scheduled periodic maintenance shall be reset. One additional servicing may also be performed as unscheduled maintenance if there is an overt indication of malfunction and if the malfunction or repair of the malfunction does not render the test engine unrepresentative of engines in use.

(D) Manufacturers may schedule service to the EGR system at the scheduled major engine tuneup(s) if failure to perform EGR system maintenance is not likely as determined by the Administrator, to result in an improvement in engine performance. One additional servicing may also be performed as unscheduled maintenance if there is an overt indication of malfunction and if the malfunction or repair of the malfunction does not render the test engine unrepresentative of engines in use.

(iv) The catalytic converter may be serviced once during durability testing (1,500 hours for gasoline-fueled engines or 1,000 hours for diesel engines)

if an audible and/or visual signal approved by the Administrator alerts the engine operator to the need for maintenance. The signal may be activated either by component failure or need for maintenance at a scheduled point.

(v) Any other engine, emission control system, or fuel system adjustment, repair, removal, disassembly, cleaning or replacement on durability-data engines shall be performed only with the advance approval of the Administrator.

(A) In the case of unscheduled maintenance, such approval will be given if the Administrator:

(*1*) Has made a preliminary determination that part failure or system malfunction, or the repair of such failure or malfunction, does not render the engine unrepresentative of engines in use, and does not require direct access to the combustion chamber, except for spark plug, fuel injection components, or removable prechamber removal or replacement; and,

(*2*) Has made a determination that the need for maintenance or repairs is indicated by an overt indication of malfunction such as persistent misfiring, engine stalling, overheating, fluid leakage, loss of oil pressure, excessive fuel consumption or excessive power loss.

(B) Emission measurements may not be used as a means of determining the need for unscheduled maintenance under paragraph (c)(2)(v)(A)(*1*) of this section.

(C) Requests for authorization of scheduled maintenance of emission control related components not specifically authorized to be maintained by these regulations must be made prior to the beginning of durability testing. The Administrator will approve the performance of such maintenance if the manufacturer makes a satisfactory showing that the maintenance will be performed on engines in use.

(vi) If the Administrator determines that part failure or system malfunction occurrence and /or repair rendered the engine unrepresentative of engines in use, the engine shall not be used as a durability-data engine.

(3)(i) Scheduled maintenance on emission-data engines is limited to the adjustment of idle speed once before the 125-hour test point, provided the idle speed is outside the manufacturer's specification.

(ii) Any other engine, emission control system, or fuel system, adjustment, repair, removal, disassembly, cleaning, servicing, or replacement shall be performed only with the advance approval of the Administrator.

(4) [Reserved]

(5)(i) Complete emission tests (see Subparts D or H of this part for gasoline-fueled engines and Subparts D and I, of this part for diesel engines) are required, unless waived by the Administrator, before and after:

(A) Scheduled maintenance approved for durability-data engines, except maintenance performed under § 86.082-25(c)(2)(i)(C);

(B) Unscheduled maintenance which may reasonably be expected to affect emissions.

(ii) The tests before and after scheduled maintenance, which are performed on durability-data engines prior to 117 hours, are waived. The test before scheduled maintenance, which is performed on durability-data engines after 117 hours and prior to 133 hours, is waived. The after-maintenance test must be run and the results used in the deterioration factor calculation in accordance with § 86.082-28.

(iii) The idle speed reset and any scheduled maintenance on the emission-data engine shall be performed prior to the 125-hour test. The before-maintenance and after-maintenance tests associated with idle speed reset and scheduled maintenance on the emission-data engine are waived.

(iv) Test data required by this paragraph may be submitted weekly to the Administrator, but shall be air posted or delivered to the Administrator within seven (7) days after the completion of the test, along with a complete record of all pertinent maintenance.

(v) When unscheduled maintenance is approved, a preliminary engineering report, unless waived by the Administrator, shall be air posted or delivered within 7 working days. A final engineering report shall be delivered or air posted within 30 working days after the completion of the emission tests. The Administrator may approve an ex-

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tension of the time requirements for the final engineering report.

(vi) All test data, maintenance reports, and required engineering reports shall be compiled and provided to the Administrator in accordance with § 86.082-23.

(6) The Administrator shall be given the opportunity to verify the existence of an overt indication of part failure and/or engine malfunction (e.g., misfiring, stalling).

(7) Equipment, instruments, or tools may not be used to identify malfunctioning, maladjusted, or defective engine components unless the same or equivalent equipment, instruments, or tools will be available to dealerships and other service outlets, and:

(i) Are used in conjunction with scheduled maintenance on such components;

(ii) Are used subsequent to the identification of an engine failure or malfunction, as provided in paragraph (c)(2)(v)(A) of this section for durability-data engines or paragraph (c)(3) of this section for emission-data engines; or,

(iii) Unless specifically authorized by the Administrator.

[46 FR 50480, Oct. 13, 1981]

§ 86.082-26 Mileage and service accumulation: emission measurements.

(a)(1) Paragraph (a) of this section applies to light-duty vehicles and light-duty trucks.

(2) The procedure for mileage accumulation will be the Durability Driving Schedule as specified in Appendix IV to this part. A modified procedure may also be used if approved in advance by the Administrator. Except with the advance approval of the Administrator, all vehicles will accumulate mileage at a measured curb weight which is within 100 pounds of the estimated curb weight. If the loaded vehicle weight is within 100 pounds of being included in the next higher inertia weight class as specified in § 86.129, the manufacturer may elect to conduct the respective emission tests at higher loaded vehicle weight.

(3) *Emission-data vehicles.* Unless as otherwise provided for in § 86.079-23(a), emission-data vehicles shall be operated and tested as follows:

(i) *Gasoline-fueled.* (A) The manufacturer shall determine, for each engine family, the mileage at which the engine-system combination is stabilized for emission-data testing. The manufacturer shall maintain, and provide to the Administrator if requested, a record of the rationale used in making this determination. The manufacturer may elect to accumulate 4,000 miles on each test vehicle within an engine family without making a determination. Any vehicle used to represent emission-data vehicle selections under § 86.082-24(b)(1) shall be equipped with an engine and emission control system that has accumulated at least the mileage determined under this paragraph. Fuel economy data generated from certification vehicles selected in accordance with § 86.082-24(b)(1) with engine-system combinations that have accumulated more than 10,000 kilometers (6,200 miles) shall be factored in accordance with § 600.006-82(c). Complete exhaust and evaporative (if required) emission tests shall be conducted for each emission-data vehicle selection under § 86.082-24(b)(1). The Administrator may determine under § 86.082-24(f) that no testing is required.

(B) Emission tests for emission-data vehicle(s) selected under § 86.082-24(b)(1)(v) or (viii) shall be conducted under high-altitude conditions.

(C) Exhaust and evaporative emission tests for emission-data vehicle(s) selected for testing under § 86.082-24(b)(1) (i), (ii), (iv) or (vii) shall be conducted under low-altitude conditions.

(D) For each engine family, the manufacturer will select one vehicle previously selected uner § 86.082—24 (b)(1)(ii) through ((b)(1)(iv) to be tested under high—altitude conditions. If the manufacturer recommends adjustments for modifications in order to conform to emission standards at high altitude, such adjustments or modifications shall be made to the test vehicle (in accordance with the instructions to be provided to the utlimate purchaser) before being tested under high—altitude conditions.

(ii) *Diesel* (A) The manufacturer shall determine, for each engine family, the mileage at which the engine-system combination is stabilized for emission-data testing. The manufacturer shall maintain, and provide to the Administrator if requested a record of the rationale used in making this determination. The manufacturer may elect to accumulate 4,000 miles on each test vehicle within an engine family without making a determination. Any vehicle used to represent emission-data vehicle selections under § 86.082-24(b)(1) shall be equipped with an engine and emission control system that has accumulated at least the mileage determined under this paragraph. Fuel economy data generated from certification vehicles selected in accordance with § 86.082-24(b)(1) with engine-system combinations that have accumulated more than 10,000 kilometers (6,200 miles) shall be factored in accordance with § 600.006-82(c). Complete exhaust emission tests shall be conducted for each emission-data vehicle selection under § 86.082-24(b)(1). The Administrator may determine under § 86.082-24(f) that no testing is required.

(B) Emission tests for emission-data vehicle(s) selected for testing under § 86.082-24(b)(1)(v) or (viii) shall be conducted under high-altitude conditions.

(C) Emission tests for emission-data vehicle(s) selected under § 86.082-24(b)(1)(i), (ii), and (iv) shall be conducted under low-altitude conditions.

(D) For each engine family, the manufacturer will select one vehicle previously selected uner § 86.082—24 (b)(1)(ii) through ((b)(1)(iv) to be tested under high—altitude conditions. If the manufacturer recommends adjustments for modifications in order to conform to emission standards at high altitude, such adjustments or modifications shall be made to the test vehicle (in accordance with the instructions to be provided to the utlimate purchaser) before being tested under high—altitude conditions.

(iii)(A) Vehicles tested for compliance under high-altitude conditions shall be tested at an elevation of 1,620 meters ±100 meters (5,315 feet±328 feet) or the equivalent observed barometric test conditions of 83.3±1 kilopascal.

(4) *Durability-data vehicles.* Unless as otherwise provided for in § 86.079-23(a), durability-data vehicles shall be operated and tested as follows:

(i) *Gasoline-fueled.* Each gasoline-fueled durability-data vehicle selected by the Administrator or elected by the manufacturer under § 86.082-24(c)(1) shall be driven, with all emission control systems installed and operating, for 50,000 miles or such lesser distance as the Administrator may agree to as meeting the objective of this procedure. Complete exhaust emission tests shall be made on all durability-data vehicles selected by the Administrator or elected by the manufacturer under § 86.082-24(c) at test point mileage intervals that the manufacturer determines. At a minimum, complete exhaust emission tests shall be made at 5,000 miles, and at 50,000 miles. The mileage interval between test points must be of equal length except for the interval between zero miles and 5,000 miles, the final interval, and any interval before or after testing conducted in conjunction with vehicle maintenance as specified in § 86.082-25(a)(10). The Administrator may determine under § 86.082-24(f) that no testing is required.

(ii) *Diesel.* Each diesel durability-data vehicle shall be driven, with all emission control systems installed and operating, for 50,000 miles or such lesser distance as the Administrator may agree to as meeting the objectives of this procedure. Complete emission tests (see §§ 86.106 through 86.145) shall be made at test point mileage intervals that the manufacturer determines. At a minimum complete exhaust emission tests shall be made at 5,000 miles and at 50,000 miles. The mileage interval between test points must be of equal length except for the interval between zero miles and 5,000 miles, the final interval, and any interval before or after testing conducted in conjunction with vehicle maintenance as specified in § 86.082-25(a)(10).

(iii) Production durability-data vehicles selected under § 86.082-24(h)(1) shall be driven and tested in accord-

ance with paragraphs (a)(4)(i) and (a)(4)(ii) of this section with the exception that the emission test specified for the 5,000-mile point shall be conducted at the 4,000-mile point.

(iv) The manufacturer may, at its option, alter the durability-data vehicle at the selected test point to represent emission-data vehicle(s) within the same engine/system combination and perform emission tests on the altered vehicle. Upon completion of emission testing, the manufacturer may return the test vehicle to the durability-data vehicle configuration and continue mileage accumulation.

(5) All tests required by this subpart on durability-data vehicles shall be conducted within 250 miles of each of the test points.

(6)(i) If the manufacturer conducts multiple tests at any test point at which the data are intended to be used in the calculation of the deterioration factor, the number of tests must be the same at each point and may not exceed three valid tests unless the manufacturer chooses to average the test results. If the manufacturer chooses to average the test results at a test point, it may conduct more tests than the minimum number of tests conducted at any other test point. The results of all valid test data must be included in the average. The test results obtained from emission tests performed before maintenance affecting emissions shall not be averaged with test results after the maintenance. The manufacturer shall follow the same procedure for all exhaust pollutants in the vehicle's data set.

(ii) The results of all emission testing shall be supplied to the Administrator. The manufacturer shall furnish to the Administrator explanation for voiding any test. The Administrator will determine if voiding the test was appropriate based upon the explanation given by the manufacturer for the voided test. Tests between test points may be conducted as required by the Administrator. Data from all tests (including voided tests) may be submitted weekly to the Administrator, but shall be air posted or delivered to the Administrator within 7 days after completion of the test. In addition, all test data shall be compiled and provided to the Administrator in accordance with § 86.082-23. Where the Administrator conducts a test on a durability-data vehicle at a prescribed test point, the results of that test will be used in the calculation of the deterioration factor.

(iii) The results of all emission tests shall be rounded, using the "Rounding Off Method" specified in ASTM E 29-67, to the number of places to the right of the decimal point indicated by expressing the applicable emission standard of this subpart to three significant figures.

(7) Whenever a manufacturer intends to operate and test a vehicle which may be used for emission or durability data, the manufacturer shall retain in its records all information concerning all emission tests and maintenance, including vehicle alterations to represent other vehicle selections. For emission-data vehicles this information shall be submitted, including the vehicle description and specification information required by the Administrator, to the Administrator following the emission-data tests required under paragraph (a)(3) of this section. For durability-data vehicles, this information shall be submitted following the 5,000-mile test.

(8) Once a manufacturer submits the information required in paragraph (a)(7) of this section for a durability-data vehicle, the manufacturer shall continue to run the vehicle to 50,000 miles and the data from the vehicle will be used in the calculations under § 86.082-28. Discontinuation of a durability-data vehicle shall be allowed only with the written consent of the Administrator.

(9)(i) The Administrator may elect to operate and test any test vehicle during all or any part of the mileage accumulation and testing procedure. In such cases, the manufacturer shall provide the vehicle(s) to the Administrator with all information necessary to conduct this testing.

(ii) The test procedures in §§ 86.106 through 86.145 will be followed by the Administrator. The Administrator will test the vehicles at each test point. Maintenance may be performed by the manufacturer under such conditions as the Administrator may prescribe.

(iii) The data developed by the Administrator for the engine-system combination shall be combined with any applicable data supplied by the manufacturer on other vehicles of that combination to determine the applicable deterioration factors for the combination. In the case of a significant discrepancy between data developed by the Administrator and that submitted by the manufacturer, the Administrator's data shall be used in the determination of deterioration factors.

(10) Emission testing of any type with respect to any certification vehicle other than that specified in this part is not allowed except as such testing may be specifically authorized by the Administrator.

(11) This section does not apply to testing conducted to meet the requirements of § 86.079-23(b)(2).

(b)(1) Paragraph (b) of this section applies to heavy-duty engines.

(2)(i) For gasoline-fueled engines, the dynamometer service accumulation schedule will consist of several operating conditions which give the percent loads and the modes as specified in the following chart. The percentage of time in each mode must be held within the limits specified. The maximum observed torque for each mode in the service accumulation cycle must be determined at the rpm at which the mode is being conducted. The percent load for that mode will be determined from the maximum torque at the rpm at which the mode is being conducted.

Mode	Observed torque (percentage of maximum observed)	Percentage of time
Idle	Idle	23 (22 to 24)
CT	CT	14 (13 to 15)
PTD	10	6 (5 to 7)
Cruise	25	31 (30 to 32)
PTA	55	15 (14 to 16)
FL	90	11 (10 to 12)

(ii) The equivalent control parameter for engine loading will be manifold vacuum, manifold pressure, or torque. Usage of one of the three parameters will require approval in advance by the Administrator. The control parameter values that correspond to the appropriate percent loads as specified in the emission test cycle will be initially determined at the zero-hour point or after an appropriate break-in procedure. The control parameter values determined initially will be used for the entire service accumulation schedule. If at any time during the service accumulation the 90 percent torque value cannot be attained, the engine shall be operated at wide-open throttle.

(iii) The average speed shall be between 1,650 and 1,700 rpm. Subject to the requirements as to average speed, there must be operation at speeds in excess of 3,200 rpm (but not in excess of governed speed for governed engines or rated speed for non-governed engines) for a cumulative maximum of 0.5 percent of the actual cycle time, excluding time in transient conditions. Maximum cycle time shall be 15 minutes. A cycle approved in advance by the Administrator shall be used.

(3)(i) For diesel engines, the following criteria must be met before service accumulation can begin. Failure to comply with these requirements shall invalidate all test data submitted for an engine.

(A) Each engine shall produce at least 95 percent of the maximum horsepower, corrected to rating conditions, at 95 to 100 percent of the rated speed.

(B) The fuel rate at maximum horsepower shall be within manufacturer's specifications.

(ii) During service accumulation, hours can be credited toward the required service accumulation hours when the following criteria are met. If these criteria cannot be met, engine operation shall be discontinued and the Administrator shall be notified immediately. (Adjustments to the fuel rate can be approved under the provisions of § 86.079-25.)

(A) Each engine shall produce at least 95 percent of the maximum horsepower, at 95 to 100 percent of the rated speed, observed at the zero-hour point. Horsepower values shall be corrected to the rating conditions.

(B) The engine shall be operated at 75 percent of the inlet and exhaust restrictions specified in § 86.879-8 except that the tolerance will be ±3 inches of water and ±0.5 inch of Hg respectively.

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(C) During each emission test the inlet and exhaust restrictions shall be as specified in § 86.879-8.

(4) If a break-in procedure is used, the procedure must be the same as recommended to the ultimate purchaser. Prior approval by the Administrator is required for use of any break-in procedure. The hours accumulated during the break-in procedure will not be counted as part of the service accumulation.

(5) *Emission-data engines:* The manufacturer shall determine for each engine family, the number of hours at which the engine system combination is stabilized for emission-data testing. The manufacturer shall maintain, and provide to the Administrator if requested a record of the rationale used in making this determination. The manufacturer may elect to accumulate 125 hours on each test engine within an engine family without making a determination. Any engine used to represent emission-data engine selections under § 86.082-24(b)(2) shall be equipped with an engine-system combination that has accumulated at least the number of hours determined under this paragraph. Complete exhaust emission tests shall be conducted for each emission-data engine selection under § 86.082-24(b)(2). Evaporative emission controls need not be connected provided normal operating conditions are maintained in the engine induction system. The Administrator may determine under § 86.082-24(f) that no testing is required.

(6) *Durability-data engines:* Each gasoline-fueled durability-data engine shall be operated, with all emission control systems installed and operating, for 1,500 hours. Each diesel durability-data engine shall be operated for 1,000 hours. A zero-hour emission test may be performed prior to beginning service accumulation. Complete emission tests shall be made at a minimum of 125 hours and the completion of service accumulation. The service hours interval between test points must be of equal length except for the interval between zero hours and 125 hours, the final interval, and any interval before or after testing conducted in conjunction with vehicle maintenance as specified in § 86.082-25(c)(5). Evaporative emission controls need not be connected provided normal operating conditions are maintained in the engine induction system.

(7) All tests required by this subpart may be conducted at any accumulated number of hours within 8 hours of the test point.

(8)(i) Data from all emission tests (including voided tests) may be submitted weekly to the Administrator, but shall be air posted or delivered to the Administrator within 7 days after completion of the test. The manufacturer shall furnish to the Administrator an explanation for voiding any test. The Administrator will determine if voiding the test was appropriate based upon the explanation given by the manufacturer for the voided test. Tests between test points may be conducted as required by the Administrator. In addition, all test data shall be compiled and provided to the Administrator in accordance with § 86.082-23. Where the Administrator conducts a test on a durability-data engine at a prescribed test point, the results of that test will be used in the calculation of the deterioration factor.

(ii) If a manufacturer conducts multiple tests at any test point at which the data are intended to be used in the calculation of the deterioration factor, the number of tests must be the same at each point and may not exceed three valid tests unless the manufacturer chooses to average the test results. If the manufacturer chooses to average the test results at a test point, it may conduct more tests than the minimum number of tests conducted at any other test point. The results of the multiple tests shall be averaged to create a single value which is the test point value used in the deterioration factor calculation specified in § 86.082-28. When using this option to generate data for a particular test point, the manufacturer must include in the average all valid test data generated at that test point. The manufacturer shall follow the same procedure for all exhaust pollutants. The test results obtained from emission tests performed before and after maintenance affecting emissions shall not be averaged.

(iii) The results of all emission tests shall be recorded and reported to the Administrator using two places to the right of the decimal point. These numbers shall be rounded in accordance with the "Rounding Off Method" specified in ASTM E 29-67.

(9) Whenever a manufacturer intends to operate and test an engine which may be used for emission or durability data, the manufacturer shall retain in its records all information concerning all emission tests and maintenance, including engine alterations to represent other engine selections. For emission-data engines this information shall be submitted, including the engine description and specification information required by the Administrator, to the Administrator following the emission-data tests required under paragraph (b)(5) of this section. For durability-data engines, this information shall be submitted following the final durability-data test.

(10) Once a manufacturer begins to operate an emission-data or durability-data engine, as indicated by compliance with paragraph (b)(9) of this section, he shall continue to run any emission-data engine to 125 hours, any gasoline-fueled durability-data engine to 1,500 hours, and any diesel durability-data engine to 1,000 hours. The data from the engine will be used in the calculations under § 86.345. Discontinuation of an engine shall be allowed only with the prior written consent of the Administrator.

(11)(i) The Administrator may elect to operate and test any test engine during all or any part of the service accumulation and testing procedure. In such cases the manufacturer shall provide the engine(s) to the Administrator with all information necessary to conduct the testing.

(ii) The test procedure (Subpart D of this part for gasoline-fueled engines, and Subparts D and I of this part for diesel engines) will be followed by the Administrator. The Administrator will test the engines at each test point. Maintenance may be performed by the manufacturer under such conditions as the Administrator may prescribe.

(iii) The data developed by the Administrator for the engine-system combination shall be combined with any applicable data supplied by the manufacturer on other engines of that combination to determine the applicable deterioration factors for the combination. In the case of a significant discrepancy between data developed by the Administrator and that submitted by the manufacturer, the Administrator's data shall be used in the determination of deterioration factors.

(12) Emission testing of any type with respect to any certification engine other than that specified in this subpart is not allowed except as such testing may be specifically authorized by the Administrator.

[45 FR 67007, Oct. 8, 1980, as amended at 46 FR 50483, Oct. 13, 1981]

§ 86.082-28 Compliance with emission standards.

(a)(1) Paragraph (a) of this section applies to light-duty vehicles and light-duty trucks.

(2) The applicable exhaust and fuel evaporative emission standards of this subpart apply to the emissions of vehicles for their useful life.

(3) Since it is expected that emission control efficiency will change with mileage accumulation on the vehicle, the emission level of a vehicle which has accumulated 50,000 miles will be used as the basis for determining compliance with the standards.

(4) The procedure for determining compliance of a new motor vehicle with exhaust emission standards is as follows:

(i) Separate emission deterioration factors shall be determined from the exhaust emission results of the durability-data vehicle(s) for each engine-system combination. A separate factor shall be established for exhaust HC, exhaust CO, exhaust NO_x, and exhaust particulate (diesel vehicles only) for each engine-system combination. A separate evaporative emission deterioration factor shall be determined for each evaporative emission family-evaporative emission control system combination from the testing conducted by the manufacturer (gasoline-fueled vehicles only).

(A) The applicable results to be used, unless excluded by paragraph

(a)(4)(i)(A)(*4*) of this section, in determining the exhaust emission deterioration factors for each engine-system combination shall be:

(*1*) All valid exhaust emission data from the test required under § 86.080-26(a)(4) except the zero-mile tests. This shall include the official test results, as determined in § 86.079-29 for all tests conducted on all durability-data vehicles of the combination selected under § 86.080-24(c) (including all vehicles elected to be operated by the manufacturer under § 86.080-24(c)(1)(ii)).

(*2*) All exhaust emission data from the tests conducted before and after the scheduled maintenance provided in § 86.079-25.

(*3*) All exhaust emission data from tests required by maintenance approved under § 86.079-25, in those cases where the Administrator conditioned his approval for the performance of such maintenance on the inclusion of such data in the deterioration factor calculation.

(*4*) The manufacturer has the option of applying an outlier test point procedure to completed durability data within its certification testing program for a given model year. The decision to apply to the outlier procedure shall be made separately for light-duty vehicles and light-duty trucks. The outlier procedure will be specified by the Administrator. For any pollutant, durability-data test points that are identified as outliers shall not be included in the determination of deterioration factors if the manufacturer has elected this option. The manufacturer shall specify to the Administrator, before the certification of the first light-duty vehicle or light-duty truck engine family for that model year, if it intends to use the outlier procedure. The manufacturer may not change procedures after the first engine family of the model year is certified. Where the manufacturer chooses to apply the outlier procedure to a data set that contains data which was averaged under § 86.082-26(a)(6)(i) the averaging shall be completed prior to applying the outlier procedure.

(B) All applicable exhaust emission results shall be plotted as a function of the mileage on the system, rounded to the nearest mile, and the best fit straight lines, fitted by the method of least squares, shall be drawn through all these data points. The data will be acceptable for use in the calculation of the deterioration factor only if the interpolated 4,000-mile and 50,000 mile points on this line are within the low-altitude standards provided in § 86.082-8 or § 86.082-9, as applicable. Exceptions to this where the data are still acceptable are when a best fit straight line crosses an applicable standard but no data points exceeded the standard, or the best fit straight line crosses an applicable standard with a negative slope (the 4,000-mile interpolated point is higher than the 50,000-mile interpolated point) but the 5,000-mile actual data point is below the standard. A multiplicative exhaust emission deterioration factor shall be calculated for each engine-system combination as follows:

Factor = Exhaust emissions interpolated to 50,000 miles divided by exhaust emissions interpolated to 4,000 miles.

These interpolated values shall be carried out to a minimum of four places to the right of the decimal point before dividing one by the other to determine the deterioration factor. The results shall be rounded to three places to the right of the decimal point in accordance with ASTM E 29-67.

(C) An evaporative emissions deterioration factor (gasoline-fueled vehicles only) shall be determined from the testing conducted as described in § 86.079-21(b)(4)(ii), for each evaporative emission family-evaporative emission control system combination to indicate the evaporative emission level at 50,000 miles relative to the evaporative emission level at 4,000 miles as follows:

Factor = Evaporative emission level at 50,000 miles minus the evaporative emission level at 4,000 miles.

The factor shall be established to a minimum of two places to the right of the decimal.

(ii)(A) The official exhaust emission test results for each emission-data vehicle at the selected test point shall be multiplied by the appropriate deterio-

ration factor: *Provided:* That if a deterioration factor as computed in paragraph (a)(4)(i)(B) of this section is less than one, that deterioration factor shall be one for the purposes of this paragraph.

(B) The official evaporative emission test results (gasoline-fueled vehicles only) for each evaporative emission-data vehicle at the selected test point shall be adjusted by addition of the appropriate deterioration factor: *Provided:* That if a deterioration factor as computed in paragraph (a)(4)(i)(C) of this section is less than zero, that deterioration factor shall be zero for the purposes of this paragraph.

(iii) The emissions to compare with the standard shall be the adjusted emissions of paragraphs (a)(4)(ii) (A) and (B) of this section for each emission-data vehicle. Before any emission value is compared with the standard, it shall be rounded, in accordance with ASTM E 29-67, to two significant figures. The rounded emission values may not exceed the standard.

(iv) Every test vehicle of an engine family must comply with the exhaust emission standards, as determined in paragraph (a)(4)(iii) of this section, before any vehicle in that family may be certified.

(v) Every test vehicle of an evaporative emission family must comply with the evaporative emission standard, as determined in paragraph (a)(4)(iii) of this section before any vehicle in that family may be certified.

(b)(1) Paragraph (b) of this section applies to heavy-duty engines.

(2) The exhaust emission standards for gasoline-fueled engines in § 86.079-10 or for diesel engines in § 86.079-11 apply to the emissions of engines for their useful life.

(3) Since emission control efficiency decreases with the accumulation of hours on the engine, the emission level of a gasoline-fueled engine which has accumulated 1,500 hours of dynamometer operation or a diesel engine which has accumulated 1,000 hours of dynamometer operation will be used as the basis for determining compliance with the standards.

(4) The procedure for determining compliance of a new engine with exhaust emission standards is as follows:

(i) Separate emission deterioration factors shall be determined from the emission results of the durability-data engines for each engine-system combination. Separate factors shall be established for HC, CO, and for the combined emissions of HC and NO_x. For diesel engines, separate factors shall also be established for the acceleration mode (designated as "A"), the lugging mode (designated as "B") and the peak opacity (designated as "C").

(A) The applicable results to be used in determining the deterioration factors for each combination shall be:

(*1*) All valid emission data from the tests required under § 86.079-26(b). These shall include the official test results, as determined in § 86.079-29, for all tests conducted on all gasoline-fueled durability-data engines of the combination selected under § 86.079-24(c)(2) or on all diesel durability-data engines of the combination selected under § 86.079-24(c)(3) (including all engines elected to be operated by the manufacturer under § 86.079-24(c)(2)(iii) for gasoline-fueled engines or under § 86.079-24(c)(3)(ii) for diesel engines).

(*2*) All emission data from the tests conducted before and after maintenance provided in § 86.079-25(c)(2)(i)(A) for gasoline-fueled engines or in § 86.079-25(c)(2)(i)(B) for diesel engines.

(*3*) All emis ion data from the tests conducted before and after maintenance provided in § 86.079-25(c)(2)(v)(C) for diesel engines if emission tests were conducted.

(*4*) The manufacturer has the option of applying an outlier test point procedure to all completed durability data within its certification testing program for a given model year. The outlier procedure will be specified by the Administrator. For any pollutant, durability-data test points that are identified as outliers shall not be included in the determination of deterioration factors if the manufacturer has elected this option. The manufacturer shall specify to the Administrator, before the certification of the first engine family for that model year, if it intends to use the outlier procedure.The manufacturer may not change procedures after the first engine family of

the model year is certified. Where the manufacturer chooses to apply the outlier procedure to a data set that contains data which was averaged under § 86.082-26(b)(8)(ii) the averaging shall be completed prior to applying the outlier procedure.

(B) All applicable emission results for (1) HC, (2) CO, (3) HC + NO_x, (4) acceleration smoke ("A"), (5) lugging smoke ("B"), and (6) peak smoke ("C") shall be plotted as a function of durability hours which shall be consistently rounded to the nearest hour. Emission data shall have two figures to the right of the decimal. The best fit straight lines, fitted by the method of least squares, shall be drawn through these data points. These data will be acceptable for use in the calculation of the deterioration factor only if the interpolated 125-hour and 1,500-hour points for gasoline-fueled engines or the 1,000-hour point for diesel engines on this line are within the low-altitude standards provided in § 86.080-10 or § 86.080-11, as applicable. Exceptions to this where the data are still acceptable are when a best fit straight line crosses an applicable standard but no data points exceeded the standard, or the best fit straight line crosses and applicable standard with a negative slope (the 125-hour interpolated point is higher than the 1,500-hour or 1,000-hour, as applicable, interpolated point) but the 125-hour actual data point is below the standard.

(C) The interpolated values shall be used to calculate a deterioration factor as follows:

Factor = Exhaust emissions interpolated to 1,500 hours for gasoline-fueled engines or 1,000 hours for diesel engines minus the exhaust emissions interpolated to 125 hours. (Negative deterioration factors shall be considered zero.)

(ii) The appropriate deterioration factor, carried out to two places to the right of the decimal point, shall be added to the exhaust emission test results, carried out to two places to the right of the decimal point, for each emission-data engine.

(iii) The emission values to compare with the standards shall be the adjusted emission values of paragraph (b)(4)(ii) of this section rounded to two significant figures in accordance with ASTM E 29-67 for each emission-data engine.

(iv) Every test engine of each engine family must comply with all applicable standards, as determined in paragraph (b)(4)(iii) of this section, before any engine in that family will be certified.

[45 FR 14506, Mar. 5, 1980, as amended at 45 FR 67009, Oct. 8, 1980; 46 FR 50485, Oct. 13, 1981]

§ 86.082-30 Certification.

(a)(1) If, after a review of the test reports and data submitted by the manufacturer, data derived from any inspection carried out under § 86.078-7(c), and any other pertient data or information, the Administrator determines that a test vehicle(s) (or test engine(s)) meet(s) the requirements of the Act and of this subpart, he will issue a certificate of conformity with respect to such vehicle(s) (or engine(s)) except in cases covered by paragraph (c) of this section.

(i) Each certificate of conformity shall state the altitudes(s) at which the vehicle(s) covered by the certificate has demonstrated compliance with the applicable emission standards.

(ii) [Reserved]

(2) Such certificate will be issued for such period not to exceed one model year as the Administrator may determine and upon such terms as he may deem necessary to assure that any new motor vehicle (or new motor vehicle engine) covered by the certificate will meet the requirements of the Act and of this part.

(3) One such certificate will be issued for each engine family. For gasoline-fueled light-duty vehicles and light-duty trucks, one such certificate will be issued for each engine family-evaporative emission family combination. Each certificate will certify compliance with no more than one set of standards except for low-altitude standards and high-altitude standards. The certificate shall cover vehicles sold or delivered to an ultimate purchaser for principal use at a designated high-altitude location only if the vehicle conforms in all material respects to the design specification that applied to those vehicles described in

the application for certification at high altitude.

(4) The adjustment or modification of any light-duty vehicle and light-duty truck in accordance with instructions provided by the manufacturer for the altitude where the vehicle is principally used will not be considered violation of Section 203(a)(3) of the Clean Air Act. A violation of Section 203(a)(1) of the Clean Air Act occurs when any manufacturer sells or delivers to an ultimate purchaser any light-duty vehicle or light-duty truck, subject to the regulations under the Act, which is not configured to meet high-altitude requirements:

(i) At a designated high-altitude location, unless such manufacturer has substantial reason to believe that such motor vehicle will not be used principally at a desingated high-altitude location; or

(ii) At an other-than-designated high-altitude location, when such manufacturer has reason to believe that such motor vehicle will be used principally at a designated high-altitude location.

(5) For the purpose of paragraph (a) of this section, "designated high-altitude location" is any county which has substantially all of its area located above 1,219 meters (4,000 feet) and which is identified below:

COUNTIES LOCATED SUBSTANTIALLY ABOVE 1,219 METERS (4,000 FEET) IN ELEVATION

State of Arizona

Apache
Cochise
Coconino
Navajo
Yavapai

State of Colorado

Adams
Alamosa
Arapahoe
Archuleta
Boulder
Chaffee
Cheyenne
Clear Creek
Conejos
Costilla
Crowley
Custer
Delta
Denver
Dolores
Douglas
Eagle
Elbert
El Paso
Fremont
Garfield
Gilpin
Grand
Gunnison
Hinsdale
Huerfano
Jackson
Jefferson
Kit Carson
Lake
La Plata
Larimer
Las Animas
Lincoln
Mesa
Mineral
Moffat
Montezuma
Montrose
Morgan
Otero
Ouray
Park
Pitkin
Pueblo
Rio Blanco
Rio Grande
Routt
Saguache
San Juan
San Miguel
Summit
Teller
Washington
Weld

State of Idaho

Bannock
Bear Lake
Bingham
Blaine
Bonneville
Butte
Camas
Caribou
Cassia
Clark
Custer
Franklin
Fremont
Jefferson
Lemhi
Madison
Minidoka
Oneida
Power
Teton
Valley

State of Montana

Beaverhead
Deer Lodge
Gallatin
Jefferson
Judith Basin
Powell
Madison
Meagher
Park
Silver Bow
Wheatland

State of Nebraska

Banner
Cheyenne
Kimball
Sioux

State of Nevada

Carson City
Douglas
Elko
Esmeralda
Eureka
Humboldt
Lander
Lincoln
Lyon
Mineral
Nye
Pershing
Storey
Washoe
White Pine

State of New Mexico

Bernalillo
Catron
Colfax
Curry
De Baca
Grant
Guadalupe
Harding
Hidalgo
Lincoln
Los Alamos
Luna
McKinley
Otero
Mora
Rio Arriba
Roosevelt
Sandoval
San Juan
San Miguel
Santa Fe
Sierra
Socorro
Taos
Torrance
Union
Valencia

State of Oregon

Harney	Klamath
Lake	

State of Texas

Jeff Davis	Parmer
Hudspeth	

State of Utah

Beaver	Morgan
Box Elder	Piute
Cache	Rich
Carbon	Salt Lake
Daggett	San Juan
Davis	Sanpete
Duchesne	Sevier
Emery	Summit
Garfield	Tooele
Grand	Uintah
Iron	Utah
Juab	Wasatch
Kane	Wayne
Millard	Weber

State of Wyoming

Albany	Natrona
Campbell	Niobrara
Carbon	Park
Converse	Platte
Fremont	Sublette
Goshen	Sweetwater
Hot Springs	Teton
Johnson	Uinta
Laramie	Washakie
Lincoln	Weston

(6) The provisions of paragraph (a)(4) of this section shall not apply to any light-duty vehicle or light-duty truck sold, offered for sale, introduced, or delivered for introduction into commerce in California provided that the vehicle is covered by a certificate of conformity with emission standards in effect in California.

(7) Catalyst-equipped vehicles, otherwise covered by a certificate, which are driven outside the United States, Canada, and Mexico will be presumed to have been operated on leaded gasoline resulting in deactivation of the catalysts. If these vehicles are imported or offered for the importation without retrofit of the catalyst, they will be considered not to be within the coverage of the certificate unless included in a catalyst control program operated by a manufacturer or a United States Government Agency and approved by the Administrator.

(8) For incomplete light-duty trucks, a certificate covers only those new motor vehicles which, when completed by having the primary load-carrying device or container attached, conform to the maximum curb weight and frontal area limitations described in the application for certification as required in § 86.082-21(d).

(9) For heavy-duty engines, a certificate covers only those new motor vehicle engines installed in heavy-duty vehicles which conform to the minimum gross vehicle weight rating, curb weight, or frontal area limitations for heavy-duty vehicles described in § 86.082-2.

(b)(1) The Administrator will determine whether a vehicle (or engine) covered by the application complies with applicable standards by observing the following relationships:

(i) *Light-duty vehicles and light-duty trucks.* (A) The durability-data vehicle(s) selected under § 86.082-24(c)(1)(i) shall represent all vehicles of the same engine-system combination.

(B) The emission-data vehicle(s) selected under § 86.082-24(b)(1)(ii) through (b)(1)(v) shall represent all vehicles of the same engine-system combination as applicable.

(C) The emission-data vehicle(s) selected under § 86.082-24(b)(1)(vii) shall represent all vehicles of the same evaporative control system within the evaporative emission family, as applicable.

(D) The emisison-data vehicle(s) selected under § 86.082-24(b)(1)(v) shall represent all vehicles of the same engine-system combination to be sold at high altitude.

(E) The emission-data vehicle(s) selected under § 86.082-24(b)(1)(vii)(D) shall represent all vehicles of the same evaporative control system within the evaporative family sold at high altitude.

(ii)(A) *Gasoline-fueled heavy-duty engines.* A test engine selected under § 86.082-24(b)(2)(ii) and (iv) shall represent all engines in the same engine family of the same engine displacement-exhaust emission control system combination.

(B) A test engine selected under § 86.082-24(b)(2)(iii) shall represent all

engines in the same engine family of the same engine displacement-exhaust emission control system combination.

(C) A test engine selected under § 86.082-24(c)(2)(i) shall represent all engines of the same engine-system combination.

(iii)(A) *Diesel heavy-duty engines.* A test engine selected under § 86.082-24(b)(3)(ii) shall represent all engines in the same engine-system combination.

(B) A test engine selected under § 86.082-24(b)(3)(iii) shall represent all engines of that emission control system at the rated fuel delivery of the test engines.

(C) A test engine selected under § 86.082-24(c)(3)(i) shall represent all engines of the same engine-system combination.

(2) The Administrator will proceed as in paragraph (a) of this section with respect to the vehicles (or engines) belonging to an engine family or engine family-evaporative emission family combination (as applicable), all of which comply with all applicable standards.

(3) If, after a review of the test reports and data submitted by the manufacturer, data derived from any additional testing conducted pursuant to § 86.079-29, data or information derived from any inspection carried out under § 86.078-7(c) or any other pertinent data or information, the Administrator determines that one or more test vehicles (or test engines) of the certification test fleet do not meet applicable standards, he will notify the manufacturer in writing, setting forth the basis for his determination. Within 30 days following receipt of the notification, the manufacturer may request a hearing on the administrator's determination. The request shall be in writing, signed by an authorized representative of the manufacturer and shall include a statement specifying the manufacturer's objections to the Administrator's determination and data in support of such objections. If, after a review of the request and supporting data, the Administrator finds that the request raises a substantial factual issue, he shall provide the manufacturer a hearing in accordance with § 86.078-6 with respect to such issue.

(4) For light-duty vehicles and light-duty trucks the manufacturer may, at his option, proceed with any of the following alternatives with respect to an emission-data vehicle determined not in compliance with all applicable standards for which it was tested:

(i) Request a hearing under § 86.078-6; or

(ii) Remove the vehicle configuration (or evaporative vehicle configuration, as applicable) which failed, from his application;

(A) If the failed vehicle was tested for compliance with exhaust emission standards only: The Administrator may select, in place of the failed vehicle, in accordance with the selection criteria employed in selecting the failed vehicle, a new emission-data vehicle to be tested for exhaust emission compliance only.

(B) If the failed vehicle was tested for compliance with both exhaust and evaporative emission standards: The Administrator may select, in place of the failed vehicle, in accordance with the selection criteria employed in selecting the failed vehicle, a new emission-data vehicle which will be tested for compliance with both exhaust and evaporative emission standards. If one vehicle cannot be selected in accordance with the selection criteria employed in selecting the failed vehicle, then two vehicles may be selected (i.e., one vehicle to satisfy the exhaust emission vehicle selection criteria and one vehicle to satisfy the evaporative emission vehicle selection criteria). The vehicle selected to satisfy the exhaust emission vehicle selection criteria will be tested for compliance with exhaust emission standards only. The vehicle selected to satisfy the evaporative emission vehicle selection criteria will be tested for compliance with both exhaust and evaporative emission standards; or

(iii) Remove the vehicle configuration (or evaporative vehicle configuration, as applicable) which failed from the application and add a vehicle configuration(s) (or evaporative vehicle configuration(s), as applicable) not previously listed. The Administrator may require, if applicable, that the

failed vehicle be modified to the new engine code (or evaporative emission code, as applicable) and demonstrate by testing that it meets applicable standards for which it was originally tested. In addition, the Administrator may select, in accordance with the vehicle selection criteria given in § 86.082-24(b), a new emission-data vehicle or vehicles. The vehicles selected to satisfy the exhaust emission vehicle selection criteria will be tested for compliance with exhaust emission standards only. The vehicles selected to satisfy the evaporative emission vehicle selection criteria will be tested for compliance with both exhaust and evaporative emission standards; or

(iv) Correct a component or system malfunction and show that with a correctly functioning system or component the failed vehicle meets applicable standards for which it was originally tested. The administrator may require a new emission-data vehicle, of identical vehicle configuration (or evaporative vehicle configuration, as applicable) to the failed vehicle, to be operated and tested for compliance with the applicable standards for which the failed vehicle was originally tested.

(5) For heavy-duty engines the manufacturer may, at his option, proceed with any of the following alternatives with respect to any engine family represented by a test engine(s) determined not in compliance with applicable standards:

(i) Request a hearing under § 86.078-6; or

(ii) Delete from the application for certification the engines represented by the failing test engine. (Engines so deleted may be included in a later request for certification under § 86.079-32.) The Administrator may then select in place of each failing engine an alternate engine chosen in accordance with selection criteria employed in selecting the engine that failed; or

(iii) Modify the test engine and demonstrate by testing that it meets applicable standards. Another engine, which is in all material respects the same as the first engine, as modified, may then be operated and tested in accordance with applicable test procedures.

(6) If the manufacturer does not request a hearing or present the required data under paragraphs (b)(4) or (b)(5) (as applicable) of this section, the Administrator will deny certification.

(c)(1) Not withstanding the fact that any certification vehicle(s) (or certification engine(s)) may comply with other provisions of this subpart, the Administrator may withhold or deny the issuance of a certificate of conformity (or suspend or revoke any such certificate which has been issued) with respect to any such vehicle(s) (or engine(s)) if:

(i) The manufacturer submits false or incomplete information in his application for certification thereof;

(ii) The manufacturer renders inaccurate any test data which he submits pertaining thereto or otherwise circumvents the intent of the Act, or of this part with respect to such vehicle (or engine);

(iii) Any EPA Enforcement Officer is denied access on the terms specified in § 86.078-7(c) to any facility or portion thereof which contains any of the following:

(A) The vehicle (or engine);

(B) Any components used or considered for use in its modification or buildup into a certification vehicle (or certification engine);

(C) Any production vehicle (or production engine) which is or will be claimed by the manufacturer to be covered by the certificate;

(D) Any step in the construction of a vehicle (or engine) described in (C) of this subdivision;

(E) Any records, documents, reports, or histories required by this part to be kept concerning any of the above;

(iv) Any EPA Enforcement Officer is denied "reasonable assistance" (as defined in § 86.078-7(c)) in examining any of the items listed in paragraph (c)(1)(iii) of this section.

(2) The sanctions of withholding, denying, revoking, or suspending of a certificate may be imposed for the reasons in paragraphs (c)(1)(i), (ii), (iii), or (iv) of this section only when the infraction is substantial.

(3) In any case in which a manufacturer knowingly submits false or inaccurate information or knowingly ren-

ders inaccurate or invalid any test data or commits any other fraudulent acts and such acts contribute substantially to the Administrator's decision to issue a certificate of conformity, the Administrator may deem such certificate void ab initio.

(4) In any case in which certification of a vehicle (or engine) is proposed to be withheld, denied, revoked, or suspended under paragraph (c)(1)(iii) or (c)(1)(iv) of this section, and in which the Administrator has presented to the manufacturer involved reasonable evidence that a violation of § 86.078-7(c) in fact occurred, the manufacturer, if he wishes to contend that, even though the violation occurred, the vehicle (or engine) in question was not involved in the violation to a degree that would warrant withholding denial, revocation, or suspension of certification under either paragraph (c)(1)(iii) or (c)(1)(iv) of this section, shall have the burden of establishing that contention to the satisfaction of the Administrator.

(5) Any revocation or suspension of certification under paragraph (c)(1) of this section shall:

(i) Be made only after the manufacturer concerned has been offered an opportunity for a hearing conducted in accordance with § 86.078-6 hereof.

(ii) Extend no further than to forbid the introduction into commerce of vehicles (or engines) previously covered by the certification which are still in the hands of the manufacturer, except in cases of such fraud or other misconduct as makes the certification invalid ab initio.

(6) The manufacturer may request in the form and manner specified in paragraph (b)(3) of this section that any determination made by the Administrator under paragraph (c)(1) of this section to withhold or deny certification be reviewed in a hearing conducted in accordance with § 86.078-6. If the Administrator finds, after a review of the request and supporting data, that the request raises a substantial factual issue, he will grant the request with respect to such issue.

(d)(1) Notwithstanding the fact that any vehicle configuration or engine family may be covered by a valid outstanding certificate of conformity, the Administrator may suspend such outstanding certificate of conformity in whole or in part with respect to such vehicle configuration or engine family if:

(i) The manufacturer refuses to comply with the provisions of a test order issued by the Administrator pursuant to § 86.603; or

(ii) The manufacturer refuses to comply with any of the requirements of § 86.603; or

(iii) The manufacturer submits false or incomplete information in any report or information provided pursuant to the requirements of § 86.609; or

(iv) The manufacturer renders inaccurate any test data which he submits pursuant to § 86.609; or

(v) Any EPA Enforcement Officer is denied access to a facility on the terms specified in § 86.606; or

(vi) Any EPA Enforcement Officer is denied the opportunity on the terms specified in § 86.606, to:

(A) Monitor vehicle selection pursuant to § 86.607, or

(B) Select vehicles for testing pursuant to § 86.607, or

(C) Monitor vehicle testing performed to satisfy any of the requirements of this part; or

(vii) Any EPA Enforcement Officer is denied "reasonable assistance" as defined in § 86.606 in examining any of the items listed in that section; or

(viii) The manufacturer refuses to comply with the requirements of §§ 86.604(a), 86.605, and 86.607, 86.608, 86.610, or 86.611.

(2) The sanction of suspending a certificate may not be imposed for the reasons in paragraphs (d)(1) (i), (ii), or (viii) of this section where such refusal is caused by conditions and circumstances outside the control of the manufacturer which renders it impossible to comply with those requirements. Such conditions and circumstances shall include, but not be limited to, any uncontrollable factors which results in the temporary unavailability of equipment and personnel needed to conduct the required tests, such as equipment breakdown or failure or illness of personnel, but shall not include failure of the manufacturer to adequately plan for and provide the equipment and personnel needed

to conduct the tests. The manufacturer will bear the burden of establishing the presence of the conditions and circumstances required by this paragraph.

(3) The sanctions of suspending a certificate may be imposed for the reasons in paragraphs (d)(1) (iii), (iv), (v), (vi), or (vii) of this section only when the infraction is substantial.

(4) In any case in which a manufacturer knowingly submitted false or inaccurate information or knowingly rendered inaccurate any test data or committed any other fraudulent acts, and such acts contributed substantially to the Administrator's original decision not to suspend or revoke a certificate of conformity in whole or in part, the Administrator may deem such certificate void from the date of such fraudulent act.

(5) In any case in which certification of a vehicle is proposed to be suspended under paragraph (d)(1)(v), (d)(1)(vi), or (d)(1)(vii) of this section, and in which the Administrator has presented to the manufacturer involved reasonable evidence that a violation of § 86.606 in fact occurred, the manufacturer, if he wishes to contend that even though the violation occurred, the vehicle configuration or engine family in question was not involved in the violation to the degree that would warrant suspension of certification under either paragraph (d)(1)(v), (d)(1)(vi), or (d)(1)(vii) of this section, shall have the burden of establishing that contention to the satisfaction of the Administrator.

(6) Any suspension of certification under paragraph (d)(1) of this section shall:

(i) Be made only after the manufacturer concerned has been offered an opportunity for a hearing conducted in accordance with § 86.613 hereof, and

(ii) Not apply to vehicles no longer in the hands of the manufacturer.

[45 FR 67009, Oct. 8, 1980, as amended at 46 FR 23056, Apr. 23, 1981; 46 FR 24950, May 4, 1981; 46 FR 50486, Oct. 13, 1981]

§ 86.082-34 Alternative procedure for notification of additions and changes.

(a) A manufacturer may, in lieu of notifying the Administrator in advance of an addition of a vehicle (or engine) under § 86.079-32 or a change in a vehicle (or engine) under § 86.079-33, notify the Administrator concurrently with making an addition of a vehicle or a change in a vehicle, if the manufacturer determines that following the change all vehicles (or engines) effected by the addition or change will still meet the applicable emission standards. Such notification shall include a full description of the addition or change and any supporting documentation the manufacturer may desire to include to support the manufacturer's determination. The manufacturer's determination that the addition or change does not cause noncompliance shall be based on an engineering evaluation of the addition or change and/or testing.

(b) The Administrator may require that additional emission testing be performed to support the manufacturers original determination submitted in paragraph (a) of this section. If additional testing is required the Administrator shall proceed as in § 86.079-32 (b) and (c) or § 86.079-33 (b) and (c) as appropriate. Additional test data, if requested, must be provided within 30 days of the request or the manufacturer must rescind the addition or change immediately. The Administrator may grant additional time to complete testing. If based on this additional testing or any other information, the Administrator determines that the vehicles effected by the addition or change do not meet the applicable standards the Administrator will notify the manufacturer to rescind the addition or change immediately upon receipt of the notification.

(c) Election to produce vehicles (or engines) under this section will be deemed to be a consent to recall all vehicles (or engines) which the Administrator determines under § 86.079-32(c) do not meet applicable standards, and to cause such nonconformity to be remedied at no expense to the owner.

[46 FR 50486, Oct. 13, 1981]

§ 86.082-35 Labeling.

(a) The manufacturer of any motor vehicle (or motor vehicle engine) subject to the applicable emission stand-

ards of this subpart, shall, at the time of manufacture, affix a permanent legible label, of the type and in the manner described below, containing the information hereinafter provided, to all production models of such vehicles (or engines) available for sale to the public and covered by a certificate of conformity under § 86.082-30(a).

(1) *Light-duty vehicles and light-duty trucks.* (i) A permanent, legible label shall be affixed in a readily visible position in the engine compartment.

(ii) The label shall be affixed by the vehicle manufacturer who has been issued the certificate of conformity for such vehicle, in such a manner that it cannot be removed without destroying or defacing the label. The label shall not be affixed to any equipment which is easily detached from such vehicle.

(iii) The label shall contain the following information lettered in the English language in block letters and numerals, which shall be of a color that contrasts with the background of the label:

(A) The label heading: Vehicle Emission Control Information;

(B) Full corporate name and trademark of manufacturer;

(C) Engine displacement (in cubic inches), engine, family identification and evaporative family identification;

(D) Engine tune-up specifications and adjustment, as recommended by the manufacturer in accordance with the altitude at which the vehicle is to be sold for principal use to the ultimate purchaser, including but not limited to idle speed(s), ignition timing, the idle air-fuel mixture setting procedure and value; e.g., idle CO, idle air-fuel ratio, idle speed drop, high idle speed, initial injection timing, and valve lash (as applicable), as well as other parameters deemed necessary by the manufacturer. These specifications should indicate the proper transmission position during tune-up and what accessories (e.g., air conditioner), if any should be in operation. If adjustments or modifications to the vehicle are necessary to ensure compliance with emission standards at either high or low altitude, the manufacturer shall either include the instructions for such adjustments on the label, or indicate on the label where instructions for such adjustments may be found. The label shall indicate whether the engine tune-up or adjustment specifications are applicable to high altitude, low altitude or both.

(E) An unconditional statement of compliance with the appropriate model year U.S. Environmental Protection Agency regulations which apply to light-duty vehicles;

(F) A statement, if applicable, that the adjustments or modifications indicated on the label are necessary to ensure emission control compliance at the altitude specified.

(G) A statement, if applicable, that the high-altitude vehicle was designed or modified for principal use at high altitude. This statement must be affixed by the manufacturer at the time of assembly or by any dealer who performs the high-altitude modification or adjustment prior to sale to an ultimate purchaser.

(H) A statement, if applicable, that the vehicle has been exempted from meeting the high-altitude gaseous emission standards as specified in § 86.082-8(g)(2) and § 86.083-9(g)(2), and that its unsatisfactory performance under high-altitude conditions makes it unsuitable for principal use at high altitude.

(I) A statement, if applicable, that the vehicle has been exempted from meeting the high-altitude gaseous emissions standards as specified in § 86.082-9(g)(2) and, as a consequence, the emission performance warranty provisions of 40 CFR Part 85, Subpart V do not apply when the vehicle is tested at high altitude.

(2) *Heavy-duty engines.* (i) A permanent legible label shall be affixed to the engine in a position in which it will be readily visible after installation in the vehicle.

(ii) The label shall be attached to an engine part necessary for normal engine operation and not normally requiring replacement during engine life.

(iii) The label shall contain the following information lettered in the English language in block letters and numerals which shall be of a color that contrasts with the background of the label:

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(A) The label heading: Engine Exhaust Emission Control Information;

(B) Full corporate name and trademark of manufacturer;

(C) Engine displacement (in cubic inches) and engine family and model designations;

(D) Date of engine manufacture (month and year);

(E) Engine specifications and adjustments as recommended by the manufacturer. These specifications should indicate the proper transmission position during tuneup and what accessories (e.g., air conditioner), if any, should be in operation;

(F) For gasoline-fueled engines the label should include the idle speed, ignition timing, and the idle air-fuel mixture setting procedure and value (e.g., idle CO, idle air-fuel ratio, idle speed drop), and valve lash.

(G) For diesel engines the label should include the advertised hp at rpm, fuel rate at advertised hp in mm^3 stroke, valve lash, initial injection timing, and idle speed.

(H) An unconditional statement of compliance with appropriate model year (e.g., 1979) U.S. Environmental Protection Agency regulations applicable to heavy-duty engines.

(iv) The label may be made up of one or more pieces; *Provided*, That all pieces are permanently attached to the same engine or vehicle part as applicable.

(b) The provisions of this section shall not prevent a manufacturer from also reciting on the label that such vehicle (or engine) conforms to any applicable state emission standards for new motor vehicles (or new motor vehicle engines) or any other information that such manufacturer deems necessary for, or useful to, the proper operation and satisfactory maintenance of the vehicle (or engine).

(c)(1) The manufacturer of any light-duty vehicle or light-duty truck subject to the emission standards of this subpart shall, in addition and subsequent to setting forth those statements on the label required by the Department of Transportation (DOT) pursuant to 49 CFR 567.4, set forth on the DOT label or on an additional label located in proximity to the DOT label and affixed as described in 40 CFR 567.4(b), the following information in the English language, lettered in block letters and numerals not less than three thirty-seconds of an inch high, of a color that contrasts with the background of the label:

(i) The Heading: "Vehicle Emission Control Information."

(ii) The statement: "This Vehicle Conforms to U.S. EPA Regulations Applicable to 19— Model Year New Motor Vehicles."

(iii) One of the following statements, as applicable, in letters and numerals not less than six thirty-seconds of an inch high and of a color that contrasts with the background of the label:

(A) For all vehicles certified as non-catalyst-equipped: "Non-Catalyst"

(B) For all vehicles certified as catalyst-equipped which are included in a manufacturer's catalyst control program for which approval has been given by the Administrator: "Catalyst—Approved for Import"

(C) For all vehicles certified as catalyst-equipped which are not included in a manufacturer's catalyst control program for which prior approval has been given by the Administrator: "Catalyst"

(2) In lieu of selecting either of the labeling options of paragraph (c)(1) of this section, the manufacturer may add the information required by paragraph (c)(1)(iii) of this section to the label required by paragraph (a) of this section. The required information will be set forth in the manner prescribed by paragraph (c)(1)(iii) of this section.

(d) Incomplete light-duty trucks or incomplete heavy-duty vehicles optionally certified as light-duty trucks shall have the following prominent statement printed on the label required in paragraph (a)(1) of this section in lieu of the statement required by paragraph (a)(1)(iii)(E) of this section: "This vehicle conforms to U.S. EPA regulations applicable to 19— Model Year New Motor Vehicles when completed at a maximum curb weight of —— pounds and a maximum frontal area of — square feet."

(e) Incomplete heavy-duty vehicles having an 8,500 pound gross vehicle weight rating or less shall have the following statement printed on the label required in paragraph (a)(2) of

this section in lieu of the statement required by paragraph (a)(2)(iii)(H) of this section: "This engine conforms to U.S. EPA regulations applicable to 19— Model Year New Heavy-Duty Engines when installed in a vehicle completed at a curb weight of more than 6,000 pounds or with a frontal area greater than 45 square feet."

(f) The manufacturer of any incomplete vehicle shall notify the purchaser of such vehicle of any curb weight, frontal area, or gross vehicle weight rating limitations affecting the emission certificate applicable to that vehicle. This notification shall be transmitted in a manner consistent with National Highway Traffic Safety Administration safety notification requirements published in 49 CFR Part 568.

[45 FR 67013, Oct. 8, 1980]

§ 86.082-38 Maintenance instructions.

(a) The manufacturer shall furnish or cause to be furnished to the purchaser of each new motor vehicle (or motor vehicle engine) subject to the standards prescribed in §§ 86.082-8, 86.082-9, 86.079-10, or 86.079-11, as applicable, written instructions for the maintenance and use of the vehicle (or engine) by the purchaser as may be reasonable and necessary to assure the proper functioning of the emission control system.

(1) Such instructions shall be provided for those vehicle and engine components listed in Appendix VI to this part (and for any other components) to the extent that maintenance of these components is necessary to assure the proper functioning of emission control system.

(2) Such instructions shall be in clear, and to the extent practicable, nontechnical language.

(b) The maintenance instructions required by this section shall contain a general description of the documentation which the manufacturer will require from the ultimate purchaser or any subsequent purchaser as evidence of compliance with the instructions.

(c) For gasoline-fueled light-duty vehicles and light-duty trucks.

(1) Such instructions shall specify the performance of all scheduled maintenance performed by the manufacturer under § 86.079-25(a), and shall explain the conditions under which EGR system and catalytic converter maintenance are to be performed (e.g., what type of warning device is being employed and whether the device is activated by component failure or the need for periodic maintenance).

(2) Such instructions shall indicate what adjustments or modifications, if any, are necessary to allow the vehicle to meet applicable emission standards at elevations above 4,000 feet, or at elevations of 4,000 feet or less.

(d) For diesel light-duty vehicles and light-duty trucks.

(1) Such instructions shall specify the performance of all scheduled maintenance performed by the manufacturer under § 86.079-25(a) and shall explain the conditions under which EGR system and catalytic converter maintenance are to be performed (e.g., what type of warning device is being employed and whether the device is activated by component failure or the need for periodic maintenance).

(2) Such instructions shall indicate what adjustments or modifications, if any, are necessary to allow the vehicle to meet applicable emission standards at elevations above 4,000 feet, or at elevations of 4,000 feet or less.

(e) For gasoline-fueled heavy-duty engines, such instructions shall specify the performance of all scheduled maintenance performed by the manufacturer under § 86.079-25(c)(2). Scheduled maintenance in addition to that performed on the durability-data engine under § 86.079-25(c)(2) may be recommended for reasons such as to offset the effects of operating conditions which differ from the dynamometer durability cycle or to increase the life of the engine beyond 1,500 hours (or the equivalent). The instructions may schedule maintenance on a calendar time basis and/or mileage basis in addition to the engine service time basis that was followed by the manufacturer under § 86.079-25(c)(2).

(f) For diesel heavy-duty engines, such instructions shall specify the performance of all scheduled maintenance performed by the manufacturer under § 86.079-25(c)(2). Scheduled maintenance in addition to that per-

formed on the durability-data engine under § 86.079-25(c)(2) may be recommended for reasons such as to offset the effects of operating conditions which differ from the dynamometer durability cycle or to increase the life of the engine beyond 1,000 hours (or the equivalent). The instructions may schedule maintenance on a calendar time basis, mileage basis, engine service time basis, or combinations of each.

[45 FR 67014, Oct. 8, 1980]

§ 86.083-9 Emission standards for 1983 and later model year light-duty trucks.

(a)(1) The standards set forth in paragraphs (a) through (c) of this section shall apply for trucks sold for principal use at other-than-designated high-altitude locations. Exhaust emissions from 1983 and later model year light-duty trucks shall not exceed:

(i) *Hydrocarbons.* 1.7 gram per vehicle mile (1.06 gram per vehicle kilometer);

(ii) *Carbon Monoxide.* 18 grams per vehicle mile (11.16 grams per vehicle kilometer);

(iii) *Oxides of Nitrogen.* 2.3 grams per vehicle mile (1.43 grams per vehicle kilometer);

(iv) *Particulate Emissions* (diesels only). 0.60 gram per vehicle mile (0.373 gram per vehicle kilometer).

(2) The standards set forth in paragraphs (a)(1) of this section refer to the exhaust emitted over a driving schedule as set forth in Subpart B and measured and calculated in accordance with those procedures.

(b)(1) Fuel evaporative emissions from 1983 and later model year gasoline-fueled light-duty trucks shall not exceed:

(i) *Hydrocarbons.* 2.0 grams per test.

(2) The standard set forth in paragraph (b)(1) of this section refers to a composite sample of the fuel evaporative emissions collected under the conditions set forth in Subpart B and measured in accordance with those procedures.

(c) No crankcase emissions shall be discharged into the ambient atmosphere from any 1983 and later model year gasoline-fueled light-duty truck.

(d)(1) Model year 1983 light-duty trucks sold for principal use at a designated high-altitude location shall be capable of meeting the following exhaust emission standards when tested under high-altitude conditions.

(i) *Hydrocarbons.* 2.0 grams per vehicle mile (1.24 grams per vehicle kilometer);

(ii) *Carbon monoxide.* 26 grams per vehicle mile (16.2 grams per vehicle kilometer);

(iii) *Oxides of nitrogen.* 2.3 grams per vehicle mile (1.43 grams per vehicle kilometer).

(2) The standards set forth in paragraph (d)(1) of this section refer to the exhaust emitted over a driving schedule as set forth in Subpart B of this part and measured and calculated in accordance with those procedures.

(e) (1) Fuel evaporative emissions from any 1983 model year gasoline-fueled light-duty truck sold for principal use at a designated high-altitude location shall not exceed 2.6 grams per test when tested under high altitude.

(2) The standard set forth in paragraph (e)(1) of this section refers to a composite sample of the fuel evaporative emission collected under the conditions set forth in Subpart B of this part and measured in accordance with those procedures.

(f) No crankcase emissions shall be discharged into the ambient atmosphere from any 1983 model year gasoline-fueled light-duty truck sold for principal use at a designated high-altitude location.

(g)(1) Any light-duty truck that a manufacturer wishes to certify for sale at low altitude must be capable of meeting high-altitude emission standards (specified in paragraphs (d) through (f) of this section). The manufacturer may specify vehicle adjustments or modifications to allow the vehicle to meet high-altitude standards but these adjustments or modifications may not alter the vehicle's basic engine, inertia weight class, transmission configuration, and axle ratio.

(i) A manufacturer may certify unique vehicle configurations to meet the high-altitude standards. The manufacturer is not required to certify these vehicle configurations to meet the low-altitude standards.

(ii) Any adjustments or modifications that are recommended to be performed on vehicles to satisfy the re-

quirements of paragraph (g)(1) of this section:

(A) Shall be capable of being effectively performed by commercial repair facilities.

(B) Must be included in the manufacturer's application for certification.

(2) The manufacturer may exempt 1983 model year light-duty trucks from high-altitude emission standards as set forth in paragraph (d) of this section. No specific justification for the exemption need be included in the application for certification. The exemptions may include up to 30 percent of the manufacturer's projected light-duty trucks sales for principal use at designated high-altitude locations for the 1983 model year. For this purpose, the sales percentage will be based on sales projections for individual vehicle configurations to be exempted. Exemptions will cover individual vehicle configurations, or groups of vehicle configurations, as specified by the manufacturer.

(3) The sale of a vehicle for principal use at a designated high-altitude location that has been exempted as set forth in paragraph (g)(2) of this section will not be considered a violation of section 203(a)(1) of the Clean Air Act.

(4) The manufacturer may exempt vehicles from the high-altitude emission standards as set forth in paragraph (d) of this section if the vehicles are not intended for sale at high altitude and if the vehicles fall within the definition of vehicles eligible for exemption. A vehicle shall be considered eligible for exemption if its design parameters [displacement-to-weight ratio (D/W) and engine speed-to-vehicle speed (N/V)] simultaneously fall within the exempted range for that manufacturer for that year. The exempted range is determined according to the following procedure:

(i) The manufacturer shall graphically display the D/W and N/V data of all vehicle configurations it will offer for the model year in question. The axis of the abscissa shall be D/W (where (D) is the engine displacement expressed in cubic centimeters and (W) is the equivalent vehicle test weight expressed in pounds), and the axis of the ordinate shall be N/V (where (N) is the crank shaft speed expressed in revolutions per minute and (V) is the vehicle speed expressed in miles per hour). At the manufacturer's option, either the 1:1 transmission gear ratio or the lowest numerical gear ratio available in the transmission will be used to determine N/V. The gear selection must be the same for all N/V data points on the manufacturer's graph. For each transmission/axle ratio combination, only the lowest N/V value shall be used in the graphical display.

(ii) The product line is then defined by the equation, $N/V = C(D/W)^{-0.9}$, where the constant, (C), is determined by the requirement that all the vehicle data points either fall on the line or lie to the upper right of the line as displayed on the graph.

(iii) The exemption line is then defined by the equation, $N/V = C(0.84\ D/W)^{-0.9}$, where the constant, (C), is the same as that found in paragraph (g)(2)(ii) of this section.

(iv) The exempted range includes all values of N/V and D/W which simultaneously fall to the lower left of the exemption line as drawn on the graph.

(5) No exemptions will be granted under paragraph (g)(4) to any manufacturer that has exempted vehicle configurations as set forth in paragraph (g)(2).

(6) The sale of a vehicle for principal use at a designated high-altitude location that has been exempted as set forth in paragraph (g)(4) of this section will be considered a violation of section 203(a)(1) of the Clean Air Act.

[45 FR 67015, Oct. 8, 1980, as amended at 46 FR 23056, Apr. 23, 1981; 47 FR 21796, May 20, 1982]

§ 86.084-2 Definitions.

The definitions in § 86.080-2 remain effective. The definitions listed in this section apply beginning with the 1984 model year.

"Approach angle" means the smallest angle in a plan side view of an automobile, formed by the level surface on which the automobile is standing and a line tangent to the front tire static loaded radius arc and touching the underside of the automobile forward of the front tire.

"Axle clearance" means the vertical distance from the level surface on which an automobile is standing to the lowest point on the axle differential of the automobile.

"Breakover angle" means the supplement of the largest angle, in the plan side view of an automobile, that can be formed by two lines tangent to the front and rear static loaded radii arcs and intersecting at a point on the underside of the automobile.

"Curb-idle" means:

(1) For manual transmission code light-duty trucks, the engine speed with the transmission in neutral or with the clutch disengaged and with the air conditioning system, if present, turned off. For automatic transmission code light-duty trucks, curb-idle means the engine speed with the automatic transmission in the Park position (or the Neutral position if there is no Park position), and with the air conditioning system, if present, turned off.

(2) For manual transmission code heavy-duty engines, the manufacturer's recommended engine speed with the transmission in neutral or with the clutch disengaged. For automatic transmission code heavy-duty engines, curb-idle means the manufacturer's recommended engine speed with the automatic transmission in gear and the output shaft stalled.

"Departure angle" means the smallest angle, in a plan side view of an automobile, formed by the level surface on which the automobile is standing and a line tangent to the rear tire static loaded radius arc and touching the underside of the automobile rearward of the rear tire.

"Emission-related maintenance" means that maintenance which does substantially affect emissions or which is likely to affect the deterioration of the vehicle or engine with respect to emissions, even if the maintenance is performed at some time other than that which is recommended.

"Non-emission related maintenance" means that maintenance which does not substantially affect emissions and which does not have a lasting effect on the deterioration of the vehicle or engine with respect to emissions once the maintenance is performed at any particular date.

"Scheduled maintenance" means any adjustment, repair, removal, disassembly, cleaning, or replacement of vehicle components or systems which is performed on a periodic basis to prevent part failure or vehicle (if the engine were installed in a vehicle) malfunction, or anticipated as necessary to correct an overt indication of vehicle malfunction or failure for which periodic maintenance is not appropriate.

"Special features enabling off-street or off-highway operation and use" means a vehicle:

(1) That has 4-wheel drive; and

(2) That has at least four of the following characteristics calculated when the automobile is at curb weight, on a level surface, with the front wheels parallel to the vehicle's longitudinal centerline, and the tires inflated to the manufacturer's recommended pressure;

(i) Approach angle of not less than 28 degrees.

(ii) Breakover angle of not less than 14 degrees.

(iii) Departure angle of not less than 20 degrees.

(iv) Running clearance of not less than 8 inches.

(v) Front and rear axle clearances of not less than 7 inches each.

"Static loaded radius arc" means a portion of a circle whose center is the center of a standard tire-rim combination of an automobile and whose radius is the distance from that center to the level surface on which the automobile is standing, measured with the automobile at curb weight, the wheel parallel to the vehicle's longitudinal centerline, and the tire inflated to the manufacturer's recommended pressure.

"Unscheduled maintenance" means any adjustment, repair, removal disassembly, cleaning, or replacement of vehicle components or systems which is performed to correct a part failure or vehicle (if the engine were installed in a vehicle) malfunction which was not anticipated.

"Useful life" means:

(a) For light-duty vehicles a period of use of 5 years or 50,000 miles, whichever first occurs.

(b)(1) For a light-duty truck engine family or heavy-duty engine family, the average period of use up to engine retirement or rebuild, whichever occurs first, as determined by the manufacturer under Section 86.084-21(b)(4)(ii)(B).

(2) For a specific light-duty truck or heavy-duty engine, the period of use represented by the first occurring of the following:

(i) The engine reaches the point of needing to be rebuilt, according to the criteria established by the manufacturer under § 86.084-21(b)(4)(ii)(C), or

(ii) The engine reaches its engine family's useful life.

(3) If the useful life of a specific light-duty truck or heavy-duty engine is found to be less than 5 years or 50,000 miles (or the equivalent), the useful life shall be a period of use of 5 years or 50,000 (or the equivalent), whichever occurs first, as required by section 202(d)(2) of the Act.

[45 FR 63747, Sept. 25, 1980]

§ 86.084-4 Section numbering; construction.

(a) *Section numbering.* (1) The model year of initial applicability is indicated by the last two digits of the 5-digit group. A section remains in effect for subsequent model years until it is superseded. The number following the hyphen designates what previous section is replaced by a future regulation.

EXAMPLES: Section 86.077-6 applies to the 1977 and subsequent model years until superseded. If a § 86.080-6 is promulgated it would take effect with the 1980 model year; § 86.077-6 would not apply after the 1979 model year. Section 86.077-10 would be replaced by § 86.078-10 beginning with the 1978 model year.

(2) Where a section still in effect references a section that has been superseded, the reference shall be interpreted to mean the superseding section.

(b) *Construction.* Except where indicated, the language in this subpart applies to both vehicles and engines. In many instances, language referring to engines is enclosed in parentheses and immediately follows the language discussing vehicles.

[45 FR 63747, Sept. 25, 1980]

§ 86.084-5 General standards; increase in emissions; unsafe conditions.

(a)(1) Every new motor vehicle (or new motor vehicle engine) manufactured for sale, sold, offered for sale, introduced, or delivered for introduction to commerce, or imported into the United States for sale or resale which is subject to any of the standards prescribed in this subpart shall be covered by a certificate of conformity issued pursuant to §§86.081-21, 86.081-22, 86.079-23, and §§ 86.079-29 through 86.079-34.

(2) No heavy-duty vehicle manufacturer shall take any of the actions specified in section 203(a)(1) of the Act with respect to any gasoline-fueled or Diesel heavy-duty vehicle which uses an engine which has not been certified as meeting applicable standards. Each heavy-duty vehicle manufacturer shall provide to the Administrator prior to the beginning of each model year a statement signed by an authorized representative which includes the following information:

(i) A description of the vehicles which will be produced subject to this section;

(ii) Identification of the engines used in the vehicles;

(iii) Projected sales data on each vehicle-engine combination;

(iv) A statement that the engines will not be modified by the vehicle manufacturer or a detailed specification of any changes which will be made. Changes made solely for the purpose of mounting an engine in a vehicle need not be included.

(v) A statement that the engine maintenance instruction supplied by the engine manufacturer, in compliance with § 86.079-38, will be furnished to the ultimate purchaser. If these maintenance instructions are modified, a detailed description of the modifications and a justification for each must be provided to the Administrator for review. The Administrator will notify the manufacturer of the determination whether the modified instructions are reasonable and necessary to assure proper functioning of the emission control system.

(b)(1) Any system installed on or incorporated in a new motor vehicle (or new motor vehicle engine) to enable such vehicle (or engine) to conform to standards imposed by this subpart

(i) Shall not in its operation or function cause the emission into the ambient air or any noxious or toxic substance that would not be emitted in the operation of such vehicle (or engine) without such system, except as specifically permitted by regulation; and

(ii) Shall not in its operation, function, or malfunction result in any unsafe condition endangering the motor vehicle, its occupants, or persons or property in close proximity to the vehicle.

(2) In establishing the physically adjustable range of each adjustable parameter on a new motor vehicle (or new motor vehicle engine), the manufacturer shall ensure that, taking into consideration the production tolerances, safe vehicle driveability characteristics are available within that range, as required by section 202(a)(4) of the Clean Air Act.

(3) Every manufacturer of new motor vehicles (or new motor vehicle engines) subject to any of the standards imposed by this subpart shall, prior to taking any of the actions specified in section 203(a)(1) of the Act, test or cause to be tested motor vehicles (or motor vehicle engines) in accordance with good engineering practice to ascertain that such test vehicles (or test engines) will meet the requirements of this section for the useful life of the vehicle (or engine).

[45 FR 4150, Jan. 21, 1980]

§ 86.084-9 Emission standards for 1984 light-duty trucks.

(a)(1) Exhaust emissions from 1984 and later model year light-duty trucks shall not exceed:

(i) *Hydrocarbons.* 0.8 gram per vehicle mile (0.5 gram per vehicle kilometer);

(ii) *Carbon Monoxide.* (A) 10 grams per vehicle mile (6.2 grams per vehicle kilometer);

(B) 0.47 percent of exhaust gas flow at curb idle;

(iii) *Oxides of Nitrogen.* 2.3 grams per vehicle mile (1.4 grams per vehicle kilometer);

(iv) *Particulate Emissions* (diesels only). 0.60 gram per vehicle mile (0.373 gram per vehicle kilometer).

(2) The standards set forth in paragraphs (a)(1)(i), (a)(1)(ii)(A), (a)(1)(iii), and (a)(1)(iv) of this section refer to the exhaust emitted over a driving schedule as set forth in Subpart B and measured and calculated in accordance with those procedures. The standard set forth in paragraph (a)(1)(ii)(B) of this section refers to the exhaust emitted at curb idle and measured and calculated in accordance with the procedures set forth in Subpart P of this part.

(b)(1) Fuel evaporative emissions from 1984 and later model year gasoline-fueled light-duty trucks shall not exceed: *Hydrocarbons.* 2.0 grams per test.

(2) The standard set forth in paragraph (b)(1) of this section refers to a composite sample of the fuel evaporative emissions collected under the conditions set forth in Subpart B and measured in accordance with those procedures.

(c) No crankcase emissions shall be discharged into the ambient atmosphere from any 1984 and later model year light-duty truck.

(d)(1) Model year 1984 and later light-duty trucks sold for principal use at designated high-altitude locations shall not exceed the following exhaust emission standards when tested at the high-altitude reference point if the manufacturer of such vehicles elects to demonstrate compliance with the high-altitude standards.

(i) *Hydrocarbons.* 2.0 grams per vehicle mile;

(ii) *Carbon Monoxide.* 26.0 grams per vehicle mile;

(iii) *Oxides of Nitrogen.* 2.3 grams per vehicle mile.

(2) The standards set forth in paragraph (d)(1) of this section refer to the exhaust emitted over a driving schedule as set forth in Subpart B of this part and measured and calculated in accordance with those procedures.

(e)(1) Fuel evaporative emissions from 1984 and later model year gasoline-fueled light-duty trucks sold for

principal use at designated high-altitude areas shall not exceed 2.6 grams per test when tested at the high-altitude reference point if the manufacturer of such vehicles elects to demonstrate compliance with high-altitude emission standards.

(2) The standard set forth in paragraph (e)(1) of this section refers to a composite sample of the fuel evaporative emission collected under the conditions set forth in Subpart B of this part and measured in accordance with those procedures.

[45 FR 63748, Sept. 25, 1980]

§ 86.084-10 Emission standards for 1984 and later model year gasoline-fueled heavy-duty engines.

(a)(1) Exhaust emissions from new 1984 and later model year gasoline-fueled heavy-duty engines shall not exceed the following:

(i) *Hydrocarbons.* 1.3 grams per brake horsepower hour, as measured under transient operating conditions.

(ii) *Carbon monoxide.* (A) 15.5 grams per brake horsepower hour, as measured under transient operating conditions.

(B) 0.47 percent of the exhaust gas flow at curb idle.

(iii) *Oxides of nitrogen.* 10.7 grams per brake horsepower hour, as measured under transient operating conditions.

(2) The standards set forth in paragraph (a)(1) of this section refer to the exhaust emitted over operating schedules set forth in Subparts N or P and measured and calculated in accordance with those procedures.

(b) [Reserved]

(c) No crankcase emissions shall be discharged into the ambient atmosphere from any new 1984 model year gasoline-fueled heavy-duty engine.

(d) Every manufacturer of new motor vehicle engines subject to the standards prescribed in this section shall, prior to taking any of the actions specified in section 203(a)(1) of the Act, test or cause to be tested motor vehicle engines in accordance with applicable procedures in Subparts N or P of this part to ascertain that such test engines meet the requirements of paragraphs (a) and (c) of this section.

[45 FR 4151, Jan. 21, 1980]

§ 86.084-11 Emission standards for 1984 diesel heavy-duty engines.

(a)(1) Exhaust emissions from new 1984 model year diesel heavy-duty engines shall not exceed the following:

(i) *Hydrocarbons.* (A) 1.3 grams per brake horsepower hour, as measured under transient operating conditions (Subpart N), or

(B) 0.5 grams per brake horsepower hour, as measured under steady-state operating conditions (Subpart D).

(ii) *Carbon monoxide.* (A) 15.5 grams per brake horsepower hour, as measured under either transient operating conditions (Subpart N) or under steady-state operating conditions (Subpart D).

(iii) *Oxides of nitrogen.* (A) 10.7 grams per brake horsepower hour, as measured under transient operating conditions (Subpart N) or

(B) 9.0 grams per brake horsepower-hour as measured steady-state operating conditions (Subpart D).

(2) The standards set forth in paragraph (a)(1) of this section refer to the exhaust over operating schedules as set forth in Subparts N, D, or P and measured and calculated in accordance with those procedures.

(b)(1) The opacity of smoke emissions from new 1984 and later model year diesel heavy-duty engines shall not exceed:

(i) 20 percent during the engine acceleration mode.

(ii) 15 percent during the engine lugging mode.

(iii) 50 percent during the peaks in either mode.

(2) The standards set forth in paragraph (b)(1) of this section refer to the exhaust smoke emissions generated under the conditions set forth in Subpart I of this part and measured and calculated in accordance with those procedures.

(c) No crankcase emissions shall be discharged into the ambient atmosphere from any new 1984 model year naturally-aspirated diesel heavy-duty engine. This provision does not apply to turbocharged engines.

(d) Every manufacturer of new motor vehicle engines subject to the standards prescribed in this section

shall, prior to taking any of the actions specified in section 203(a)(1) of the Act, test or cause to be tested motor vehicle engines in accordance with applicable procedures in Subparts I, N, D, or P of this part to ascertain that such test engines meet the requirements of paragraphs (a), (b) and (c) of this section.

[45 FR 4151, Jan. 21, 1980]

§ 86.084-21 Application for certification.

(a) A separate application for a certificate of conformity shall be made for each set of standards (except for high-altitude standards) and each class of new motor vehicles or new motor vehicle engines. Such application shall be made to the Administrator by the manufacturer and shall be updated and corrected by amendment.

(b) The application shall be in writing, signed by an authorized representative of the manufacturer, and shall include the following:

(1)(i) Identification and description of the vehicles (or engines) covered by the application and a description of their engine (vehicles only), emission control system and fuel system components. This shall include a detailed description of each auxiliary emission control device (AECD) to be installed in or on any certification test vehicle (or certification test engine).

(ii)(A) The manufacturer shall provide to the Administrator in the preliminary application for certification:

(*1*) A list of those parameters which are physically capable of being adjusted (including those adjustable parameters for which access is difficult) and that, if adjusted to settings other than the manufacturer's recommended setting, may affect emissions;

(*2*) A specification of the manufacturer's intended physically adjustable range of each such parameter, and the production tolerances of the limits or stops used to establish the physically adjustable range;

(*3*) A description of the limits or stops used to establish the manufacturer's intended physically adjustable range of each adjustable parameter, or any other means used to inhibit adjustment;

(*4*) The nominal or recommended setting, and the associated production tolerances, for each such parameter.

(B) The manufacturer may provide, in the preliminary application for certification, information relating to why certain parameters are not expected to be adjusted in actual use and to why the physical limits or stops used to establish the physically adjustable range of each parameter, or any other means used to inhibit adjustment, are expected to be effective in preventing adjustment of parameters on in-use vehicles to settings outside the manufacturer's intended physically adjustable ranges. This may include results of any tests to determine the difficulty of gaining access to an adjustment or exceeding a limit as intended or recommended by the manufacturer.

(C) The Administrator may require to be provided detailed drawings and descriptions of the various emission related components, and/or hardware samples of such components, for the purpose of making his determination of which vehicle or engine parameters will be subject to adjustment for new certification and Selective Enforcement Audit testing and of the physically adjustable range for each such vehicle or engine parameter.

(2) Projected U.S. sales data sufficient to enable the Administrator to select a test fleet representative of the vehicles (or engines) for which certification is requested.

(3) A description of the test equipment and fuel proposed to be used.

(4)(i) A description of the test procedures to be used to establish the evaporative emission deterioration factors required to be determined and supplied in § 86.084-23(b)(2).

(ii)(A) A description of the test procedures to be used to establish the durability data or the exhaust emission deterioration factors required to be determined and supplied in § 86.084-23(b)(1).

(B)(*1*) A statement of the useful life of use of each light-duty truck engine family and heavy-duty engine family up to engine retirement or rebuild (which ever occurs first) as determined by the manufacturer on the basis of the following:

(*i*) For existing engine families, survey information on in-service vehicles (or engines) or;

(*ii*) For new engine families, durability testing of prototype vehicles (or engines) or a combination of bench-type component life evaluations and survey information on similar previous vehicles (or engines).

(*2*) The manufacturer shall not determine an engine family's useful life to be less than the basic period of the mechanical warranty on the engine assembly. This useful life shall be expressed as a period of engine or vehicle operation or as an equivalent vehicle mileage (or both) and shall be consistent with the rebuild criteria specified in paragraph (b)(4)(ii)(C) of this section. The manufacturer shall include in the application the data or information on which it based its determination of the useful life.

(C) For each light-duty truck engine family and heavy-duty engine family, a statement of the criteria which are to be used in determining the need for engine rebuild and their critical values, including the following:

(*1*) The minimum cylinder compression for any one cylinder and for any two cylinders, in pounds per square inch (or kilopascals). Compression shall be measured without the addition of oil or another fluid into the cylinder.

(*2*) The maximum rate of engine lubricant oil usage by the engine, in quarts per 1,000 miles (or quarts per 30 hours).

(*3*) The maximum mass of foreign metal in the crankcase, in grams per quart of crankcase oil.

(*4*) Any other measurable indicator(s) of engine condition approved by the Administrator and the critical value(s) which signal(s) the need for a rebuild.

(*5*) A statement of recommended maintenance and procedures necessary to assure that the vehicles (or engines) covered by a certificate of conformity in operation conform to the regulations, and a description of the program for training of personnel for such maintenance, and the equipment required.

(*6*) At the option of the manufacturer, the proposed composition of the emission-data test fleet or (where applicable) the durability-data test fleet.

(c) Complete copies of the application and of any amendments thereto, and all notifications under §§ 86.079-32, 86.079-33, and 86.079-34 shall be submitted in such multiple copies as the Administrator may require.

(d) Incomplete light-duty trucks shall have a maximum completed curb weight and maximum completed frontal area specified by the manufacturer.

[45 FR 63748, Sept. 25, 1980]

§ 86.084-22 Approval of application for certification; test fleet selections; determinations of parameters subject to adjustment for certification and Selective Enforcement Audit, adequacy of limits, and physically adjustable ranges.

(a) After a review of the application for certification and any other information which the Administrator may require, the Administrator may approve the application and select a test fleet in accordance with § 86.084-24.

(b) The Administrator may disapprove in whole or in part an application for certification for reasons including incompleteness, inaccuracy, inappropriate proposed mileage (or service) accumulation procedures, test equipment, or fuel, and incorporation of defeat devices in vehicles (or on engines) described by the application.

(c) Where any part of an application is rejected, the Administrator shall notify the manufacturer in writing and set forth the reasons for such rejection. Within 30 days following receipt of such notification, the manufacturer may request a hearing on the Administrator's determination. The request shall be in writing, signed by an authorized representative of the manufacturer and shall include a statement specifying the manufacturer's objections to the Administrator's determinations, and data in support of such objections. If, after the review of the request and supporting data, the Administrator finds that the request raises a substantial factual issue, he shall provide the manufacturer a hearing in accordance with § 86.078-6 with respect to such issue.

(d)(1) The Administrator does not approve the test procedures for establishing the evaporative emission deterioration factors. The manufacturer shall submit the procedures as required in 86.084-21(b)(4)(i) prior to the Administrator's selection of the test fleet under § 86.084-24(b)(1) and if such procedures will involve testing of durability-data vehicles selected by the Administrator or elected by the manufacturer under § 86.084-24(c)(1), prior to initiation of such testing.

(2) *Light-duty trucks and heavy-duty engines only.* The Administrator does not approve the test procedures for establishing exhaust emission deterioration factors, the manufacturer's determination of the average period of use, nor the manufacturer's determination of the values of the rebuild criteria. The manufacturer shall submit these procedures and determinations as required in § 86.084-21(b)(4)(ii) prior to determining the deterioration factors.

(e) When the Administrator selects emission-data vehicles for the test fleet, he will at the same time determine those vehicle or engine parameters which will be subject to adjustment for certification, Selective Enforcement Audit and Production Compliance Audit testing, the adequacy of the limits, stops, seals, or other means used to inhibit adjustment, and the resulting physically adjustable ranges for each such parameter and notify the manufacturer of his determinations.

(1)(i) The Administrator may determine to be subject to adjustment the idle fuel-air mixture, idle speed, and initial spark timing parameters on gasoline-fueled vehicles (or engines) (carbureted or fuel injected); the choke valve action parameter(s) on carbureted, gasoline-fueled vehicles (or engines); or any parameter on any vehicle (or engine) (diesel or gasoline-fueled) which is physically capable of being adjusted, may significantly affect emissions, and was not present on the manufacturer's vehicles (or engines) in the previous model year in the same form and function.

(ii) The Administrator may, in addition, determine to be subject to adjustment any other parameters on any vehicle or engine which is physically capable of being adjusted and which may significantly affect emissions. However, the Administrator may do so only if he has previously notified the manufacturer that he might do so and has found, at the time he gave this notice, that the intervening period would be adequate to permit the development and application of the requisite technology, giving appropriate consideration to the cost of compliance within such period. In no event will this notification be given later than September 1 of the calendar year two years prior to the model year.

(iii) In determining the parameters subject to adjustment the Administrator will consider the likelihood that, for each of the parameters listed in paragraphs (e)(1)(i) and (e)(1)(ii) of this section, settings other than the manufacturer's recommended setting will occur on in-use vehicles (or engines). In determining likelihood, the Administrator may consider such factors as, but not limited to, information contained in the preliminary application, surveillance information from similar in-use vehicles (or engines), the difficulty and cost of gaining access to an adjustment, damage to the vehicle (or engine) if an attempt is made to gain such access and the need to replace parts following such attempt, and the effect of settings other than the manufacturer's recommended setting on vehicle (or engine) performance characteristics including emission characteristics.

(2)(i) The Administrator shall determine a parameter to be adequately inaccessible or sealed if:

(A) In the case of an idle mixture screw, the screw is recessed within the carburetor casting and sealed with lead, thermosetting plastic, or an inverted elliptical spacer or sheared off after adjustment at the factory, and the inaccessibility is such that the screw cannot be accessed and/or adjusted with simple tools in one-half hour or for $20 (1978 dollars) or less.

(B) In the case of a choke bimetal spring, the plate covering the bimetal spring is riveted or welded in place, or held in place with nonreversible screws.

(C) In the case of a parameter which may be adjusted by elongating or

bending adjustable members (e.g., the choke vacuum break), the elongation of the adjustable member is limited by design or, in the case of a bendable member, the member is constructed of a material which when bent would return to its original shape after the force is removed (plastic or spring steel materials).

(D) In the case of any parameter, the manufacturer demonstrates that adjusting the parameter to settings other than the manufacturer's recommended setting takes more than one-half hour or costs more than $20 (1978 dollars).

(ii) The Administrator shall determine a physical limit or stop to be an adequate restraint on adjustability if:

(A) In the case of a threaded adjustment, the threads are terminated, pinned or crimped so as to prevent additional travel without breakage or need for repairs which take more than one-half hour or cost more than $20 (1978 dollars).

(B) The adjustment is ineffective at the end of the limits of travel regardless of additional forces or torques applied to the adjustment.

(C) The manufacturer demonstrates that travel or rotation limits cannot be exceeded with the use of simple and inexpensive tools (screwdriver, pliers, open-end or box wrenches, etc.) without incurring significant and costly damage to the vehicle (or engine) or control system or without taking more than one-half hour or costing more than $20 (1978 dollars).

(iii) If manufacturer service manuals or bulletins describe routine procedures for gaining access to a parameter or for removing or exceeding a physical limit, stop, seal or other means used to inhibit adjustment, or if surveillance data indicate that gaining access, removing, or exceeding is likely, paragraphs (e)(2)(i) and (e)(2)(ii) of this section shall not apply for that parameter.

(iv) In determining the adequacy of a physical limit, stop, seal, or other means used to inhibit adjustment of a parameter not covered by paragraph (e)(2)(i) or (e)(2)(ii) of this section, the Administrator will consider the likelihood that it will be circumvented, removed, or exceeded on in-use vehicles. In determining likelihood, the Administrator may consider such factors as, but not limited to, information contained in the preliminary application; surveillance information from similar in-use vehicles (or engines); the difficulty and cost of circumventing, removing, or exceeding the limit, stop, seal, or other means; damage to the vehicle (or engine) if an attempt is made to circumvent, remove, or exceed it and the need to replace parts following such attempt; and the effect of settings beyond the limit, stop, seal, or other means on vehicle (or engine) performance characteristics other than emission characteristics.

(3) The Administrator shall determine two physically adjustable ranges for each parameter subject to adjustment:

(i)(A) In the case of a parameter determined to be adequately inaccessible or sealed, the Administrator may include within the physically adjustable range applicable to testing under this subpart (certification testing) all settings within the production tolerance associated with the nominal setting for that parameter, as specified by the manufacturer in the preliminary application for certification.

(B) In the case of other parameters, the Administrator shall include within this range all settings within physical limits or stops determined to be adequate restraints on adjustability. The Administrator may also include the production tolerances on the location of these limits or stops when determining the physically adjustable range.

(ii)(A) In the case of a parameter determined to be adequately inaccessible or sealed, the Administrator shall include within the physically adjustable range applicable to testing under Subpart G or K (Selective Enforcement Audit and Production Compliance Audit) only the actual settings to which the parameter is adjusted during production.

(B) In the case of other parameters, the Administrator shall include within this range all settings within physical limits or stops determined to be adequate restraints on adjustability, as they are actually located on the test vehicle (or engine).

(f)(1) If the manufacturer submits the information specified in § 86.084-21(b)(1)(ii) in advance of its full preliminary application for certification, the Administrator shall review the information and make the determinations required in paragraph (e) of this section within 90 days of the manufacturer's submittal.

(2) The 90-day decision period is exclusive of the elapsed time during which EPA may request additional information from manufacturers regarding an adjustable parameter and the receipt of the manufacturers' response(s).

(g) Within 30 days following receipt of notification of the Administrator's determinations made under paragraph (e) of this section, the manufacturer may request a hearing on the Administrator's determinations. The request shall be in writing, signed by an authorized representative of the manufacturer, and shall include a statement specifying the manufacturer's objections to the Administrator's determinations, and data in support of such objections. If, after review of the request and supporting data, the Administrator finds that the request raises a substantial factual issue, he shall provide the manufacturer a hearing in accordance with § 86.078-6 with respect to such issue.

[45 FR 63749, Sept. 25, 1980]

§ 86.084-23 Required data.

(a) The manufacturer shall perform the tests required by the applicable test procedures, and submit to the Administrator the following information: *Provided, however,* that if requested by the manufacturer, the Administrator may waive any requirement of this section for testing of vehicles (or engine) for which emission data are available, or will be made available, under the provisions of § 86.081-29.

(1) [Reserved]

(2) [Reserved]

(b)(1)(i) Exhaust emission durability data on such light-duty vehicles tested in accordance with applicable test procedures and in such numbers as specified, which will show the performance of the systems installed on or incorporated in the vehicle for extended mileage, as well as a record of all pertinent maintenance performed on the test vehicles.

(ii) Exhaust emission deterioration factors for light-duty trucks and heavy-duty engines and all test data that are derived from the testing described under § 86.084-21(b)(4)(ii)(A) as well as a record of all pertinent maintenance. Such testing shall be designed and conducted in accordance with good engineering practice to assure that the engines covered by a certificate issued under § 86.084-30 will meet the emission standards in §§ 86.084-09, 86.084-10, or 86.084-11 as appropriate, in actual use for the useful life of the engine.

(2) Evaporative emission deterioration factors for each evaporative emission family-evaporative emission control system combination and all test data that are derived from testing described under § 86.084-21(b)(4)(i) designed and conducted in accordance with good engineering practice to assure that the vehicles covered by a certificate issued under § 86.084-30 will meet the evaporative emission standards in § 86.081-8 or § 86.084-9, as appropriate, for the useful life of the vehicle.

(c) *Emission data.* (1)(i) Emission data on such vehicles tested in accordance with applicable test procedures and in such numbers as specified. These data shall include zero-mile data, if generated, and emission data generated for certification as required under § 86.084-26(a)(3)(i) or § 86.084-26(a)(3)(ii).

(ii) [Reserved]

(2) *Certification engines.* Emission data on such engines tested in accordance with applicable emission test procedures, of this subpart and in such numbers as specified. These data shall include zero hour data, if generated, and emission data generated for certification as required under § 86.084-26(b)(5).

(d) A statement that the vehicles (or engines) for which certification is requested conform to the requirements in § 86.078-5(b), and that the descriptions of tests performed to ascertain compliance with the general standards in § 86.078-5(b), and the data derived from such tests, are available to the Administrator upon request.

(e)(1) A statement that the test vehicles (or test engines) with respect to which data are submitted to demonstrate compliance with the applicable standards of this subpart are in all material respects as described in the manufacturer's application for certification, have been tested in accordance with the applicable test procedures utilizing the fuels and equipment described in the application for certification and that on the basis of such tests the vehicles (or engines) conform to the requirements of this part. If such statements cannot be made with respect to any vehicle (or engine) tested, the vehicle (or engine) shall be identified, and all pertinent data relating thereto shall be supplied to the Administrator. If, on the basis of the data supplied and any additional data as required by the Administrator, the Administrator determines that the test vehicles (or test engine) were not as described in the application for certification or were not tested in accordance with the applicable test procedures utilizing the fuels and equipment as described in the application for certification, the Administrator may make the determination that the vehicle (or engine) does not meet the applicable standards. The provisions of § 86.084-30(b) shall then be followed.

(2) For evaporative emission durability, or light-duty truck or heavy-duty engine exhaust emission durability, a statement of compliance with paragraph (b)(2) or (b)(1)(ii) of this section, as applicable.

[45 FR 63750, Sept. 25, 1980, as amended at 46 FR 50486, Oct. 13, 1981]

§ 86.084-24 Test vehicles and engines.

(a)(1) The vehicles or engines covered by an application for certification will be divided into groupings of engines which are expected to have similar emission characteristics throughout their useful life. Each group of engines with similar emission characteristics shall be defined as a separate engine family.

(2) To be classed in the same engine family, engines must be identical in all the following respects:

(i) The cylinder bore center-to-center dimensions.

(ii) [Reserved]

(iii) [Reserved]

(iv) The cylinder block configuration (air cooled or water cooled; L-6, 90°, V-8, etc.).

(v) The location of the intake and exhaust valves (or ports), and the valve (or port) sizes (within a ¼-inch range on the valve head diameter or within 10 percent on the port area.)

(vi) The method of air aspiration.

(vii) The combustion cycle.

(viii) Catalytic converter characteristics.

(ix) Thermal reactor characteristics.

(x) Type of air inlet cooler (e.g., intercoolers and after coolers) for diesel heavy-duty engines.

(3)(i) Engines identical in all the respects listed in paragraph (a)(2) of this section may be further divided into different engine families if the Administrator determines that they may be expected to have different emission characteristics. This determination will be based upon a consideration of the following features of each engine:

(A) The bore and stroke.

(B) The surface-to-volume ratio of the nominally dimensioned cylinder at the top dead center positions.

(C) The intake manifold induction port size and configuration.

(D) The exhaust manifold port size and configuration.

(E) The intake and exhaust valve sizes.

(F) The fuel system.

(G) The camshaft timing and ignition or injection timing characteristics.

(ii) Light-duty trucks and heavy-duty engines produced in different model years and distinguishable in the respects listed in paragraph (a)(2) of this section shall be treated as belonging to a single engine family if the Administrator requires it, after determining that the engines may be expected to have similar emission deterioration characteristics.

(4) Where engines are of a type which cannot be divided into engine families based upon the criteria listed in paragraphs (a)(2) and (a)(3) of this section, the Administrator will establish families for those engines based upon those features most related to their emission characteristics. Engines

that are eligible to be included in the same engine family based on the criteria in paragraphs (a)(2) and (a)(3)(i) of this section may be further divided into different engine families if the manufacturer determines that they may be expected to have different emission characteristics. This determination will be based upon a consideration of the following features of each engine:

(i) The dimension from the center line of the crankshaft to the center line of the camshaft.

(ii) The dimension from the center line of the crankshaft to the top of the cylinder block head face.

(5) The gasoline-fueled vehicles covered by an application for certification will be divided into groupings which are expected to have similar evaporative emission characteristics throughout their useful life. Each group of vehicles with similar evaporative emission characteristics shall be defined as a separate evaporative emission family.

(6) To be classed in the same evaporative emission family, vehicles must be similar with respect to:

(i) Type of vapor storage device (e.g., canister, air cleaner, crankcase).

(ii) Basic canister design.

(iii) Fuel system.

(7) Where vehicles are of a type which cannot be divided into evaporative emission families based on the criteria listed above, the Administrator will establish families for those vehicles based upon the features most related to their evaporative emission characteristics.

(8)(i) If the manufacturer elects to participate in the Alternative Durability Program, the engine families covered by an application for certification shall be grouped based upon similar engine design and emission control system characteristics. Each of these groups shall constitute a separate engine family group.

(ii) To be classed in the same engine family group, engine families must contain engines identical in all of the following respects:

(A) The combustion cycle.

(B) The cylinder block configuration (air-cooled or water-cooled; L-6, V-8 rotary, etc.).

(C) Displacement (engines of different displacement within 50 cubic inches or 15 percent of the largest displacement and contained within a multidisplacement engine family will be included in the same engine family group).

(D) Catalytic converter usage and basic type (non-catalyst, oxidation catalyst only, three-way catalyst equipped).

(9) Engine families identical in all respects listed in paragraph (a)(8) of this section may be further divided into different engine family groups if the Administrator determines that they are expected to have significantly different exhaust emission control system deterioration characteristics.

(10) A manufacturer may request the Administrator to include in an engine family group, engine families in addition to those grouped under the provisions of paragraph (a)(8) of this section. This request must be accompanied by information the manufacturer believes supports the inclusion of these additional engine families.

(11) A manufacturer may combine into a single engine family group those light-duty vehicle and light-duty truck engine families which otherwise meet the requirements of paragraphs (a)(8) through (a)(10) of this section.

(b) *Emission date*—(1) *Emission-data vehicles.* Paragraph (b)(1) of this section applies to light-duty vehicle and light-duty truck emission-data vehicles.

(i) Vehicles will be chosen to be operated and tested for emission data based upon engine family groupings. Within each engine family, one test vehicle will be selected based on the following criteria: The Administrator shall select the vehicle with the heaviest equivalent test weight (including options) within the family. Then within that vehicle the Administrator shall select, in the order listed, the highest road load power, largest displacement, highest fuel flow at the speed of maximum rated torque, the transmission with the highest numerical final gear ratio (including overdrive), and the highest numerical axle ratio offered in that engine family.

(ii) The Administrator shall select one additional test vehicle from within

each engine family. The vehicle selected shall be the vehicle expected to exhibit the highest emissions of those vehicles remaining in the engine family. If all vehicles within the engine family are similar the Administrator may waive the requirements of this paragraph.

(iii) Within an engine family and exhaust emission control system, the manufacturer may alter any emission-data vehicle to represent more than one selection under paragraph (b)(1)(i), (ii), (iv), or (vii) of this section.

(iv) If the vehicles selected in accordance with paragraphs (b)(1)(i) and (ii) of this section do not represent each engine-system combination, then one vehicle of each engine-system combination not represented will be selected by the Administrator. The vehicle selected shall be the vehicle expected to exhibit the highest emissions of those vehicles remaining in the engine family.

(v) [Reserved]

(vi) [Reserved]

(vii)(A) Vehicles of each evaporative emission family will be divided into evaporative emission control systems.

(B) The Administrator will select the vehicle expected to exhibit the highest evaporative emissions, from within each evaporative family to be certified, from among the vehicles represented by the exhaust emission-data selections for the engine family, unless evaporative testing has already been completed on the vehicle expected to exhibit the highest evaporative emissions for the evaporative family as part of another engine family's testing.

(C) If the vehicles selected in accordance with paragraph (b)(1)(vii)(B) of this section do not represent each evaporative emission control system then the Administrator will select the highest expected evaporative emission vehicle from within the unrepresented evaporative system.

(D) [Reserved]

(E) [Reserved]

(2) *Gasoline-fueled heavy-duty emission-data engines.* Paragraph (b)(2) of this section applies to gasoline-fueled heavy-duty engines.

(i) Engines will be chosen to be run for emission data based upon engine family groupings. Within each engine family, the requirements of this paragraph must be met.

(ii) [Reserved]

(iii) The Administrator shall select a maximum of two engines within each engine family based upon features indicating that they may have the highest emission levels of the engines in the engine family as follows:

(A) The Administrator shall select one emission-data engine first based on the largest displacement within the engine family. Then within the largest displacement the Administrator shall select, in the order listed, highest fuel flow at the speed of maximum rated torque, the engine with the most advanced spark timing, no EGR or lowest EGR flow, and no air pump or lowest actual flow air pump.

(B) The Administrator shall select one additional engine, from within each engine family. The engine selected shall be the engine expected to exhibit the highest emissions of those engines remaining in the engine family. If all engines within the family are similar the Administrator may waive the requirements of this paragraph.

(iv) If the engines selected in accordance with paragraph (b)(2) (ii) and (iii) of this section do not represent each engine displacement-exhaust emission control system combination, then one engine of each engine displacement-exhaust emission control system combination not represented shall be selected by the Administrator.

(v) Within an engine family and emission control system, the manufacturer may alter any emission-data engine to represent more than one selection under paragraph (b)(2)(iii) and (iv) of this section.

(3) *Diesel heavy-duty emission-data engines.* Paragraph (b)(3) of this section applies to diesel heavy-duty engines emission-data vehicles.

(i) Engines will be chosen to be run for emission data based upon engine family groupings. Within each engine family, the requirements of this paragraph must be met.

(ii) Engines of each engine family will be divided into groups based upon their exhaust emission control systems. One engine of each engine

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system combination shall be run for smoke emission data and gaseous emission data. Either the complete gaseous emission test or the complete smoke test may be conducted first. Within each combination, the engine that features the highest fuel feed per stroke, primarily at the speed of maximum rated torque and secondarily at rated speed, will usually be selected. If there are military engines with higher fuel rates than other engines in the same engine system combinations, than one military engine shall also be selected. The engine with the highest fuel feed per stroke will usually be selected.

(iii) The Administrator may select a maximum of one additional engine within each engine-system combination based upon features indicating that it may have the highest emission levels of the engines of that combination. In selecting this engine, the Administrator will consider such features as the injection system, fuel system, compression ratio, rated speed, rated horsepower, peak torque speed, and peak torque.

(c) *Durability data*—(1) *Light-duty vehicle durability-data vehicles.* Paragraph (c)(1) of this section applies to light-duty vehicle durability-data vehicles.

(i) A durability-data vehicle will be selected by the Administrator to represent each engine-system combination. The vehicle selected shall be of the engine displacement with the largest projected sales volume of vehicles with that control-system combination in that engine family and will be designated by the Administrator as to transmission type, fuel system, inertia weight class, and test weight.

(ii) A manufacturer may elect to operate and test additional vehicles to represent any engine-system combination. The additional vehicles must be of the same engine displacement, transmission type, fuel system and inertia weight class as the vehicle selected for that engine-system combination in accordance with the provisions of paragraph (c)(1)(i) of this section. Notice of an intent to operate and test additional vehicles shall be given to the Administrator no later than 30 days following notification of the test fleet selection.

(2) *Light-duty trucks.* Paragraph (c)(2) of this section applies to vehicles, engines, subsystems, or components used to establish exhaust emission deterioration factors for light-duty trucks.

(i) The manufacturer shall select the vehicles, engines, subsystems, or components to be used to determine exhaust emission deterioration factors for each engine-family control system combination. Whether vehicles, engines, subsystems, or components are used, they shall be selected so that their emissions deterioration characteristics may be expected to represent those of in-use vehicles, based on good engineering judgment.

(3) *Heavy-duty engines.* Paragraph (c)(3) of this section applies to engines, subsystems, or components used to establish exhaust emission deterioration factors for heavy-duty engines.

(i) The manufacturer shall select the engines, subsystems, or components to be used to determine exhaust emission deterioration factors for each engine-family control system combination. Whether engines, subsystems, or components are used, they shall be selected so that their emissions deterioration characteristics may be expected to represent those of in-use engines, based on good engineering judgment.

(d) For purposes of testing under § 86.084-26(a)(9) or (b)(11), the Administrator may require additional emission-data vehicles (or emission-data engines) and durability-data vehicles (light-duty vehicles only) identical in all material respects to vehicles (or engines) selected in accordance with paragraphs (b) and (c) of this section, *provided* that the number of vehicles (or engines) selected shall not increase the size of either the emission-data fleet or the durability-data fleet by more than 20 percent or one vehicle (or engine), whichever is greater.

(e)(1) Any manufacturer whose projected sales for the model year in which certification is sought is less than:

(i) 2,000 gasoline-fueled light-duty vehicles, or

(ii) 2,000 diesel light-duty vehicles, or

(iii) 2,000 gasoline-fueled light-duty trucks, or

(iv) 2,000 diesel light-duty trucks, or
(v) 2,000 gasoline-fueled heavy-duty engines, or
(vi) 2,000 diesel heavy-duty engines,
may request a reduction in the number of test vehicles (or engines) determined in accordance with the foregoing provisions of this section. The Administrator may agree to such lesser number as he determines would meet the objectives of this procedure.

(2) Any manufacturer may request to certify engine families with combined total sales of fewer than 10,000 light-duty vehicles, light-duty trucks, and heavy-duty engines utilizing assigned deterioration factors prescribed by the Administrator. The assigned deterioration factors shall be applied only to entire engine families.

(f) In lieu of testing an emission-data or durability-data vehicle (or engine) selected under paragraph (b) or (c) of this section, and submitting data therefor, a manufacturer may, with the prior written approval of the Administrator, submit exhaust emission data and/or fuel evaporative emission data, as applicable on a similar vehicle (or engine) for which certification has previously been obtained or for which all applicable data required under § 86.084-23 has previously been submitted.

(g)(1) This paragraph applies to light-duty vehicles and light-duty trucks, but does not apply to the production vehicles selected under paragraph (h) of this section.

(2) Where it is expected that more than 33 percent of the vehicles in an engine family will be equipped with an optional item, the full estimated weight of that item shall be included, if required by the Administrator, in the curb weight computation for each vehicle available with that option in the engine family. Where it is expected that 33 percent or less of the vehicles in an engine family will be equipped with an item of optional equipment, no weight for that item will be added in computing curb weight. In the case of mutually exclusive options, only the weight of the heavier option will be added in computing curb weight. Optional equipment weighing less than 3 pounds per item need not be considered.

(3)(i) Where it is expected that more than 33 percent of a car line within an engine-system combination will be equipped with an item of optional equipment that can reasonably be expected to influence emissions, then such items shall actually be installed (unless excluded under paragraph (g)(3)(ii) of this section) on all emission-data and durability-data vehicles of that car line, within that engine-system combination, on which the items are intended to be offered in production. Optional equipment that can reasonably be expected to influence emissions are the air conditioner, power steering, power brakes and other items determined by the Administrator.

(ii) If the manufacturer determines by test data or engineering evaluation that the actual installation of the optional equipment required by paragraph (g)(3)(i) of this section does not affect the emissions or fuel economy values, the optional equipment need not be installed on the test vehicle. The weight of the options shall be included in the design curb weight and also be represented in the weight of the test vehicles. The engineering evaluation, including any test data, used to support the deletion of optional equipment from test vehicles, shall be maintained by the manufacturer and shall be made available to the Administrator upon request.

(4) Optional equipment that can reasonably be expected to influence emissions which is utilized on 33 percent or less of the vehicles in the engine family shall not be installed on any vehicle in that engine family unless specifically required under this section.

(h) *Alternative Durability Program durability-data vehicles.* Paragraph (h) of this section applies to light-duty vehicle and light-duty truck durability-data vehicles selected under the Alternative Durability Program. The Alternative Durability Program is described in § 86.081-13.

(1) In order to update the durability data to be used to determine a deterioration factor for each engine family group, the Administrator will select durability-data vehicles from the manufacturer's production line. Production vehicles will be selected from the

1981, 1982, and 1983 model year production of vehicles.

(i) The Administrator shall select the production durability-data vehicle designs from the designs that the manufacturer offers for sale. For each model year and for each engine family group, the Administrator may select production durability-data vehicle designs of equal number to the number of engine families within the engine family group, up to a maximum of three vehicles.

(ii) The production durability-data vehicles representing the designs selected in paragraph (h)(1)(i) of this section will be randomly selected from the manufacturer's production. The Administrator will make these random selections unless the manufacturer (with prior approval of the Administrator) elects to make the random selections.

(iii) The manufacturer may select additional production durability-data vehicle designs from within the engine family group. The production durability-data vehicles representing these designs shall be randomly selected from the manufacturer's production in accordance with paragraph (h)(1)(ii) of this section.

(iv) For each production durability-data vehicle selected under paragraph (h)(1) of this section, the manufacturer shall provide to the Administrator (before the vehicle is tested or begins service accumulation) the vehicle identification number. Before the vehicle begins service accumulation the manufacturer shall also provide the Administrator with a description of the durability-data vehicle as specified by the Administrator.

(2) If, within an existing engine family group, a manufacturer requests to certify vehicles of a new design, engine family, emission control system, or with any other durability-related design difference, the Administrator will determine if the existing engine family group deterioration factor is appropriate for the new design. If the Administrator cannot make this determination or deems the deterioration factor not appropriate, the Administrator shall select preproduction durability-data vehicles under the provisions of paragraph (c) of this section. If vehicles are then certified using the new design, the Administrator may select production vehicles with the new design under the provisions of paragraph (h)(1) of this section.

(3) If a manufacturer requests to certify vehicles of a new design that the Administrator determines are a new engine family group, the Administrator shall select preproduction durability-data vehicles under the provisions of paragraph (c) of this section. If vehicles are then certified using the new design, the Administrator may select production vehicles of that design under the provisions of paragraph (h)(1) of this section.

[45 FR 63751, Sept. 25, 1980, as amended at 46 FR 50487, Oct. 13, 1981]

§ 86.084-25 Maintenance.

(a) *Light-duty vehicles and light-duty trucks.* Paragraph (a) of this section applies to light-duty vehicles and light-duty trucks.

(1) Scheduled maintenance on the engine, emission control system, and fuel system of durability-data vehicles, selected by the Administrator or elected by the manufacturer under § 86.084-24(c)(1), shall be scheduled for performance during durability testing at the same mileage intervals that will be specified in the manufacturer's maintenance instructions furnished to the ultimate purchaser of the motor vehicle. This maintenance schedule may be updated as necessary throughout the durability-data vehicle's testing provided that no maintenance operation is deleted from the maintenance schedule after the operation has been performed on the test vehicle. Such maintenance shall be performed, except as provided in paragraph (a)(5)(iii) of this section, only under the following provisions:

(i) Scheduled major engine tuneups to manufacturer's specifications may be performed no more frequently than every 12,500 miles of scheduled driving: Provided that no tuneup may be performed after 45,000 miles of scheduled driving. A scheduled major engine tuneup shall be restricted to paragraph (a)(1)(i) (A) or (B) of this section, and shall be conducted in a

manner consistent with service instructions and specifications provided by the manufacturer for use by customer service personnel.

(A) *For gasoline-fueled vehicles,* the following items may be inspected, replaced, cleaned, adjusted, and/or serviced as required:

(*1*) Ignition system.

(*2*) Cold starting enrichment system (includes fast idle speed setting).

(*3*) Curb idle speed and air/fuel mixture.

(*4*) Drive belt tension on engine accessories.

(*5*) Valve lash.

(*6*) Inlet air and exhaust gas control valves.

(*7*) Engine bolt torque.

(*8*) Spark plugs.

(*9*) Fuel filter and air filter.

(*10*) Crankcase emission control system.

(*11*) Fuel evaporative emission control system.

(B) *For diesel vehicles,* a major engine tuneup shall be restricted to the following:

(*1*) Adjust low idle speed.

(*2*) Adjust valve lash if required.

(*3*) Adjust injector timing.

(*4*) Adjust governor.

(*5*) Clean and service injector tips.

(*6*) Adjust drive belt tension on engine accessories.

(*7*) Check engine bolt torque and tighten as required.

(ii) Change of engine and transmission oil, and change or service of oil filter will be allowed at the same mileage intervals that will be specified in the manufacturer's maintenance instructions.

(iii) Readjustment of the engine idle speed (curb idle and fast idle) may be performed, in addition to adjustment during scheduled major engine tuneups, once during the first 5,000 miles of vehicle operation.

(2)(i) *For gasoline-fueled vehicles,* unscheduled maintenance on the engine, emission control system, and fuel system of durability vehicles may be performed, except as provided in paragraph (a)(5)(i) of this section, only under the following provisions:

(A) Any persistently misfiring spark plug may be replaced, in addition to replacement at scheduled major engine tuneup points.

(B) Readjustment of the engine cold starting enrichment system may be performed if there is a problem of stalling or if there is visible black smoke.

(C) Readjustment of the engine idle-speed (curb idle and fast idle) may be performed, in addition to that performed as scheduled maintenance under paragraph (a)(1) of this section, if the idle speed exceeds the manufacturer's recommended idle speed by 300 rpm or more, or if there is a problem of stalling.

(D) The idle mixture may be reset, other than during scheduled major engine tuneups, only with the advance approval of the Administrator.

(ii) *For diesel vehicles,* unscheduled maintenance on the engine emission control system, and fuel system of durability-data vehicles may be performed, except as provided in paragraph (a)(5)(i) of this section, only under the following provisions:

(A) Injectors may be changed if a persistent misfire is detected.

(B) Readjustment of the engine idle speed (curb idle and fast idle) may be performed in addition to that performed as scheduled maintenance under paragraph (a)(1) of this section, if the idle speed exceeds the manufacturer's recommended idle speed by; 300 rpm or more, or if there is a problem of stalling.

(3) An exhaust gas recirculation (EGR) system may be serviced during durability testing only under one of the following provisions:

(i) Manufacturers may schedule service to the EGR system at the scheduled major engine tuneup, if an audible and/or visual signal approved by the Administrator alerts the vehicle operator to the need for EGR system maintenance at each of those mileage points. One additional servicing may also be performed as unscheduled maintenance if there is an overt indication of malfunction and if the malfunction or repair of the malfunction does not render the test vehicle unrepresentative of vehicles in use.

(ii) Manufacturers may service the EGR system a maximum of three times during the 50,000 miles either at

a scheduled major engine tuneup point or as unscheduled maintenance, if an audible and/or visual signal approved by the Administrator alerts the vehicle operator to the need for EGR system maintenance. The signal may be activated either by EGR system failure (unscheduled maintenance) or need for scheduled periodic maintenance. If maintenance is performed, the signal for scheduled periodic maintenance shall be reset. One additional servicing may also be performed as unscheduled maintenance if there is an overt indication of malfunction and if the malfunction or repair of the malfunction does not render the test vehicle unrepresentative of vehicles in use.

(iii) Manufacturers may schedule service to the EGR system at the scheduled major engine tuneup(s) if failure to perform EGR system maintenance is not likely, as determined by the Administrator, to result in an improvement in vehicle performance. One additional servicing may also be performed as unscheduled maintenance if there is an overt indication of malfunction and if the malfunction or repair of the malfunction does not render the test vehicle unrepresentative of vehicles in use.

(4) The catalytic converter may be serviced once during 50,000 miles if an audible and/or visual signal approved by the Administrator alerts the vehicle operator to the need for maintenance. The signal may be activated either by component failure or need for maintenance at a scheduled point.

(5) Any other engine, emission control system, or fuel system adjustment, repair, removal, disassembly, cleaning, or replacement on durability-data vehicles shall be performed only with the advance approval of the Administrator.

(i) In the case of unscheduled maintenance, such approval will be given if the Administrator:

(A) Has made a preliminary determination that part failure or system malfunction, or the repair of such failure or malfunction, does not render the vehicle unrepresentative of vehicles in use, and does not require direct access to the combustion chamber, except for spark plug, fuel injection component, or removable prechamber removal or replacement; and

(B) Has made a determination that the need for maintenance or repairs is indicated by an overt indication of malfunction such as persistent misfiring, vehicle stalling, overheating, fluid leakage, loss of oil pressure, or charge indicator warning. For the evaporative emission control system this overt indication may be indicated by such items as fuel odor or fluid leakage.

(ii) Emission measurements may not be used as a means of determining the need for unscheduled maintenance under paragraph (a)(5)(i)(A) of this section.

(iii) Requests for authorization of scheduled maintenance of emission control-related components not specifically authorized to be maintained by these regulations must be made prior to the beginning of durability testing. The Administrator will approve the performance of such maintenance if the manufacturer makes a satisfactory showing that the maintenance will be performed on vehicles in use.

(6) If the Administrator determines that part failure or system malfunction occurrence and/or repair rendered the vehicle unrepresentative of vehicles in use, the vehicle shall not be used as a durability-data vehicle.

(7) Where the Administrator agrees under § 86.084-26 to a mileage accumulation of less than 50,000 miles for durability testing, he may modify the requirements of this paragraph.

(8)(i) Adjustment of engine idle speed on emission-data vehicles may be performed once before the 6,436-kilometer (4,000-mile) test point. Any other engine, emission control system, or fuel system adjustment, repair, removal, disassembly, cleaning, or replacement on emission-data vehicles shall be performed only with the advance approval of the administrator.

(ii) [Reserved]

(iii) [Reserved]

(9) Repairs to vehicle components of the durability-data or emission-data vehicle, other than the engine, emission control system or fuel system, shall performed only as a result of part failure, vehicle system malfunc-

tion, or with the advance approval of the Administrator.

(10) Complete emission tests (see §§ 86.106 through 86.145) are required, unless waived by the Administrator, before and after any vehicle maintenance which may reasonably be expected to affect emissions. These test data may be submitted weekly to the Administrator, but shall be air posted or delivered to the Administrator within 7 days after completion of the tests, along with a complete record of all pertinent maintenance, including a preliminary engineering report of any malfunction diagnosis and the corrective action taken. A complete engineering report shall be delivered or air posted to the Administrator within 30 working days after the tests. In addition, all test data and maintenance reports shall be compiled and provided to the Administrator in accordance with § 86.084-23.

(11) The Administrator shall be given the opportunity to verify the existence of an overt indication of part failure and/or vehicle malfunction (e.g., misfiring, stalling, black smoke), or an activation of an audible and/or visual signal, prior to the performance of any maintenance to which such overt indication or signal is relevant under the provisions of this section.

(12) Equipment, instruments, or tools may not be used to identify malfunctioning, maladjusted, or defective engine components unless the same or equivalent equipment, instruments, or tools will be available to dealerships and other service outlets and,

(i) Are used in conjunction with scheduled maintenance on such components,

(ii) Are used subsequent to the identification of a vehicle or engine malfunction, as provided in paragraph (a)(5)(i) of this section for durability-data vehicles or paragraph (a)(8)(i) of this section for emission-data vehicles, or

(iii) Unless specifically authorized by the Administrator.

(b) *Light-duty trucks and heavy-duty engines.* Paragraph (b) of this section applies to light-duty trucks and heavy-duty engines.

(1) Any emission-related maintenance which is performed on vehicles, engines, subsystems, or components used to determine exhaust emission deterioration factors must be technologically necessary for compliance with the standards in actual use. All emission-related *scheduled* maintenance must occur at the same mileage intervals (or equivalent intervals if engines, subsystems, or components are used) that will be specified in the manufacturer's maintenance instructions furnished to the ultimate purchaser of the motor vehicle.

(i) The manufacturer must submit data to the Administrator which demonstrates that all of the emission-related scheduled maintenance which is to be performed on the durability-data vehicles is technologically necessary. EPA has determined that emission-related maintenance at shorter intervals than that outlined in paragraphs (b)(1)(ii) and (b)(1)(iii) is not technologically necessary. The Administrator may determine that even maintenance more restrictive (e.g., longer intervals) than that listed in paragraphs (b)(1)(ii) and (b)(1)(iii) is not technologically necessary.

(ii) For gasoline-fueled vehicles or engines, emission-related maintenance in addition to or at shorter intervals than that listed below will not be accepted as technologically necessary, except as provided in paragraph (b)(1)(iv).

(A) The cleaning or replacement of light-duty truck spark plugs at 30,000 miles and at 30,000-mile intervals thereafter and heavy-duty engine spark plugs at 25,000 miles and 25,000-mile intervals thereafter.

(B) The inspecting, cleaning, adjustment, or replacement of the following at 50,000 miles of use and at 50,000-mile intervals thereafter:

(*1*) Positive crankcase ventilation and exhaust gas recirculation valves;

(*2*) Emission-related hoses and tubes;

(*3*) Ignition wires;

(*4*) Oxygen sensor;

(*5*) Idle mixture.

(C) The replacement of the catalytic converter or inspecting and cleaning of the injector tips at 100,000 miles of use and at 100,000-mile (or longer) intervals thereafter.

(iii) For diesel vehicles or engines, emission-related maintenance in addi-

tion to or at shorter intervals than that listed below will not be accepted as technologically necessary, except as provided in paragraph (b)(1)(iv).

(A) The following maintenance at 50,000 miles of use and at 50,000-mile intervals thereafter.

(*1*) Cleaning or replacement of the exhaust gas recirculation and positive crankcase ventilation valves;

(*2*) Cleaning of injector tips.

(B) The cleaning, rebuilding, or replacement of the turbocharger and injectors at 100,000 miles of use and at 100,000-mile intervals thereafter for light-duty trucks or at 200,000 miles of use and at 200,000-mile intervals thereafter for heavy-duty engines.

(iv) Requests for authorization of scheduled maintenance of emission control related components in addition to those items of maintenance covered under paragraphs (b)(1)(ii) and (b)(1)(iii) will be considered if the maintenance is a direct result of the implementation of new technology. New technology means any technology not found in production on any motor vehicle prior to the 1980 model year.

(v)(A) Only the maintenance items listed in paragraphs (b)(1)(i) and (b)(1)(ii) are currently considered by EPA to be emission-related maintenance. The Administrator may, however, determine additional maintenance items to be emission-related by announcement in a FEDERAL REGISTER notice. In no event may this notification occur later than September 1 of the calendar year two years prior to the affected model year.

(B) Any manufacturer may request a hearing on the Administrator's determinations in paragraph (b)(1)(v)(A) of this section. The request shall be in writing, signed by an authorized representative of the manufacturer, and shall include a statement specifying the manufacturer's objections to the Administrator's determinations, and data in support of such objections. If, after review of the request and supporting data, the Administrator finds that the request raises a substantial factual issue, she/he shall provide the manufacturer a hearing in accordance with § 86.078-6 with respect to such issue.

(vi) [Reserved]

(vii) Non-emission related vehicle maintenance which is reasonable and necessary (e.g., oil change, oil filter change, fuel filter change, air filter change, cooling system maintenance, accessory belt inspection, adjustment of idle speed, governor, engine bolt torque, valve lash, injector lash, timing, etc.) may be performed on durability-data vehicles at the intervals recommended by the manufacturer to the ultimate purchaser.

(viii) Unscheduled maintenance may be performed during the testing used to determine deterioration factors, except as provided in paragraph (b)(1)(ix)(A) of this section, only under the following provisions:

(A) An injector or spark plug may be changed if a persistent misfire is detected.

(B) Readjustment of a gasoline-fueled vehicle or engine cold-start enrichment system may be performed if there is a problem of stalling.

(C) Readjustment of the engine idle speed (curb idle and fast idle) may be performed, if the idle speed exceeds the manufacturer's recommended idle speed by 300 rpm or more, or if there is a problem of stalling.

(ix) Any other unscheduled vehicle, engine, emission control system, or fuel system adjustment, repair, removal, disassembly, cleaning, or replacement during testing to determine deterioration factors shall be performed only with the advance approval of the Administrator.

(A) Such approval will be given if the Administrator:

(*1*) Has made a preliminary determination that the part failure or system malfunction, or the repair of such failure or malfunction, does not render the vehicle or engine unrepresentative of vehicles or engines in use, and does not require direct access to the combustion chamber, except for spark plug, fuel injection component, or removable prechamber removal or replacement; and,

(*2*) Has made a determination that the need for maintenance or repairs is indicated by an overt indication of malfunction such as persistent misfiring, engine stalling, overheating, fluid leakage, loss of oil pressure, excessive

fuel consumption or excessive power loss.

(B) Emission measurements may not be used as a means of determining the need for unscheduled maintenance under paragraph (b)(1)(vii) of this section.

(2) [Reserved]

(3)(i) Scheduled maintenance on emission-data vehicles (or engines) is limited to the adjustment of idle speed once before the 4,000-mile test point (or the 125-hour test point for engines), provided the idle speed is outside the manufacturer's specifications.

(ii)–(iii) [Reserved]

(iv) Any other engine, emission control system, or fuel system, adjustment, repair, removal, disassembly, cleaning, servicing, or replacement shall be performed only with the advance approval of the Administrator.

(4) *Light-duty trucks.* Repairs to vehicle components of the emission-data vehicle other than the engine, emission control system, or fuel system, shall be performed only as a result of part failure, vehicle system malfunction, or with the advance approval of the Administrator.

(5)(i) Complete emission tests (see Subparts B and P of this part) are required, unless waived by the Administrator, before and after catalytic converter or oxygen sensor servicing on any vehicle.

(ii) The Administrator may require emission tests before and after any unscheduled maintenance.

(iii) [Reserved]

(iv) Test data required by paragraph (b)(5) of this section shall be air posted or delivered to the Administrator within 7 working days, along with a complete record of all pertinent maintenance.

(v) When unscheduled maintenance is approved, a preliminary engineering report, unless waived by the Administrator, shall be air posted or delivered within 7 working days. A final engineering report shall be delivered or air posted within 30 working days after the completion of the emission tests. The Administrator may approve an extension of the time requirements for the final engineering report.

(vi) All test data, maintenance reports, and required engineering reports shall be compiled and provided to the Administrator in accordance with § 86.084–23.

(6) The Administrator shall be given the opportunity to verify the existence of an overt indication of part failure and/or engine malfunction (e.g., misfiring, stalling), or an activation of an audible and/or visual signal, prior to the performance of any maintenance to which such overt indication or signal is relevant under the provisions of this section.

(7) Equipment, instruments, or tools may not be used to identify malfunctioning, maladjusted, or defective engine components unless the same or equivalent equipment, instruments, or tools will be available to dealerships and other service outlets and:

(i) Are used in conjunction with scheduled maintenance on such components,

(ii) Are used subsequent to the identification of a vehicle or engine malfunction, as provided in paragraph (b)(3)(iv) of this section for emission-data vehicles, or

(iii) Unless specifically authorized by the Administrator.

[45 FR 63754, Sept. 25, 1980, as amended at 46 FR 50488, Oct. 13, 1981]

§ 86.084–26 Mileage and service accumulation; emission measurements.

(a)(1) Paragraph (a) of this section applies to light-duty vehicles.

(2) The procedure for mileage accumulation will be the Durability Driving Schedule as specified in Appendix IV to this part. A modified procedure may also be used if approved in advance by the Administrator. Except with the advance approval of the Administrator, all vehicles will accumulate mileage at a measured curb weight which is within 100 pounds of the estimated curb weight. If the loaded vehicle weight is within 100 pounds of being included in the next higher inertia weight class as specified in § 86.129, the manufacturer may elect to conduct the respective emission tests at higher loaded vehicle weight.

(3) *Emission-data vehicles.* Unless as otherwise provided for in § 86.084–

23(a), emission-data vehicles shall be operated and tested as follows:

(i) *Gasoline-fueled.* (A) The manufacturer shall determine, for each engine family, the mileage at which the engine-system combination is stabilized for emission-data testing. The manufacturer shall maintain, and provide to the Administrator if requested, a record of the rationale used in making this determination. The manufacturer may elect to accumulate 4,000 miles on each test vehicle within an engine family without making a determination. Any vehicle used to represent emission-data vehicle selections under § 86.084-24(b)(1) shall be equipped with an engine and emission control system that has accumulated at least the mileage determined under this paragraph. Fuel economy data generated from certification vehicles selected in accordance with § 86.084-24(b)(1) with engine-system combinations that have accumulated more than 10,000 kilometers (6,200 miles) shall be factored in accordance with § 600.006-82(c). Complete exhaust and evaporative (if required) emission tests shall be conducted for each emission-data vehicle selection under § 86.084-24(b)(1). The Administrator may determine under § 86.084-24(f) that no testing is required.

(B)-(C) [Reserved]

(ii) *Diesel.* (A) The manufacturer shall determine, for each engine family, the mileage at which the engine-system combination is stabilized for emission-data testing. The manufacturer shall maintain, and provide to the Administrator if requested, a record of the rationale used in making this determination. The manufacturer may elect to accumulate 4,000 miles on each test vehicle within an engine family without making a determination. Any vehicle used to represent emission-data vehicle selections under § 86.084-24(b)(1) shall be equipped with an engine and emission control system that has accumulated at least the mileage determined under this paragraph. Fuel economy data generated from certification vehicles selected in accordance with § 86.084-24(b)(1) with engine-system combinations that have accumulated more than 10,000 kilometers (6,200 miles) shall be factored in accordance with § 600.006-82(c). Complete exhaust emission tests shall be conducted for each emission-data vehicle selection under § 86.084-24(b)(1). The Administrator may determine under § 86.084-24(f) that no testing is required.

(B)-(C) [Reserved]

(4) *Durability-data vehicles.* Unless as otherwise provided for in § 86.084-23(a), durability-data vehicles shall be operated and tested as follows:

(i) *Gasoline-fueled.* Each gasoline-fueled durability-data vehicle selected by the Administrator or elected by the manufacturer under § 86.084-24(c)(1) shall be driven, with all emission control systems installed and operating, for 50,000 miles or such lesser distance as the Administrator may agree to as meeting the objective of this procedure. Complete exhaust emission tests shall be made on all durability-data vehicles selected by the Administrator or elected by the manufacturer under § 86.084-24(c) at test point mileage intervals that the manufacturer determines. At a minimum, complete exhaust emission tests shall be made at 5,000 miles, and at 50,000 miles. The mileage interval between test points must be of equal length for the interval between zero miles and 5,000 miles, the final interval, and any interval before or after testing conducted in conjunction with vehicle maintenance as specified in § 86.084-25(a)(10). The Administrator may determine under § 86.084-24(f) that no testing is required.

(ii) *Diesel.* Each diesel durability-data vehicle shall be driven, with all emission control systems installed and operating, for 50,000 miles or such lesser distance as the Administrator may agree to as meeting the objectives of the procedure. Complete emission tests (see §§ 86.106 through 86.145) shall be made at test point mileage intervals that the manufacturer determines. At a minimum complete exhaust emission tests shall be made at 5,000 miles and at 50,000 miles. The mileage interval between test points must be of equal length for the interval between zero miles and 5,000 miles, the final interval, and any interval before or after testing conducted in

conjunction with vehicle maintenance as specified in § 86.084-25(a)(10).

(iii) The manufacturer may, at its option, alter the durability-data vehicle at the selected test point to represent emission-data vehicle(s) within the same engine/system combination and perform emission tests on the altered vehicle. Upon completion of emission testing, the manufacturer may return the test vehicle to the durability-data vehicle configuration and continue mileage accumulation.

(5) All tests required by this subpart on durability-data and emission-data vehicles shall be conducted within 250 miles of each of the test points.

(6)(i) If the manufacturer conducts multiple tests at any test point at which the data are intended to be used in the calculation of the deterioration factor, the number of tests must be the same at each point and may not exceed three valid tests unless the manufacturer chooses to average the test results. If the manufacturer chooses to average the test results at a test point, it may conduct more tests than the minimum number of tests conducted at any other test point. The results of all valid test data must be included in the average. The test results obtained from emission tests performed before maintenance affecting emissions shall not be averaged with test results after the maintenance. The manufacturer shall follow the same procedure for all exhaust pollutants in the vehicle's data set.

(ii) The results of all emission testing shall be supplied to the Administrator. The manufacturer shall furnish to the Administrator explanation for voiding any test. The Administrator will determine if voiding the test was appropriate based upon the explanation given by the manufacturer for the voided test. Tests between test points may be conducted as required by the Administrator. Data from all tests (including voided tests) may be submitted weekly to the Administrator, but shall be air posted or delivered to the Administrator within 7 days after completion of the test. In addition, all test data shall be compiled and provided to the Administrator in accordance with § 86.084-23. Where the Administrator conducts a test on a durability-data vehicle at a prescribed test point, the results of that test will be used in the calculation of the deterioration factor.

(iii) The results of all emission tests shall be rounded, using the "Rounding Off Method" specified in ASTM E 29-67, to the number of places to the right of the decimal point indicated by expressing the applicable emission standard of this subpart to three significant figures.

(7) Whenever a manufacturer intends to operate and test a vehicle which may be used for emission or durability data, the manufacturer shall retain in its records all information concerning all emissions tests and maintenance, including vehicle alterations to represent other vehicle selections. For emission-data vehicles, this information shall be submitted, including the vehicle description and specification information required by the Administrator, to the Administrator following the emission-data test. For durability-data vehicles, this information shall be submitted following the 5,000-mile test.

(8) Once a manufacturer submits the information required in paragraphs (a)(7) of this section for a durability-data vehicle, the manufacturer shall continue to run the vehicle to 50,000 miles, and the data from the vehicle will be used in the calculations under § 86.084-28. Discontinuation of a durability-data vehicle shall be allowed only with the consent of the Administrator.

(9)(i) The Administrator may elect to operate and test any test vehicle during all or any part of the mileage accumulation and testing procedure. In such cases, the manufacturer shall provide the vehicle(s) to the Administrator with all information necessary to conduct this testing.

(ii) The test procedures in §§ 86.106 through 86.145 will be followed by the Administrator. The Administrator will test the vehicles at each test point. Maintenance may be performed by the manufacturer under such conditions as the Administrator may prescribe.

(iii) The data developed by the Administrator for the engine-system combination shall be combined with any applicable data supplied by the

manufacturer on other vehicles of that combination to determine the applicable deterioration factors for the combination. In the case of a significant discrepancy between data developed by the Administrator and that submitted by the manufacturer, the Administrator's data shall be used in the determination of deterioration factors.

(10) Emission testing of any type with respect to any certification vehicle other than that specified in this part is not allowed except as such testing may be specifically authorized by the Administrator.

(11) This section does not apply to testing conducted to meet the requirements of § 86.084-23(b)(2).

(b)(1) Paragraph (b) of this section applies to light-duty trucks.

(2) There are three types of mileage or service accumulation applicable to light-duty trucks:

(i) Mileage or service accumulation on vehicles, engines, subsystems, or components selected by the manufacturer under § 86.084-24(c)(2)(i). The manufacturer determines the form and extent of this mileage or service accumulation, consistent with good engineering practice, and describes it in the application for certification.

(ii) Mileage accumulation of the duration selected by the manufacturer on emission-data vehicles selected under § 86.084-24(b)(1). The procedure for mileage accumulation will be the Durability Driving Schedule as specified in Appendix IV to this part. A modified procedure may also be used if approved in advance by the Administrator. Except with the advance approval of the Administrator, all vehicles will accumulate mileage at a measured curb weight which is within 100 pounds of the estimated curb weight. If the loaded vehicle weight is within 100 pounds of being included in the next higher inertia weight class as specified in § 86.129, the manufacturer may elect to conduct the respective emission tests at the test weight corresponding to the higher loaded vehicle weight.

(iii) Service or mileage accumulation which may be part of the test procedures used by the manufacturer to establish evaporative emission deterioration factors.

(3) Exhaust emission deterioration factors will be determined on the basis of the mileage or service accumulation described in paragraph (b)(2)(i) of this section and related testing, according to the manufacturer's procedures.

(4) Each emission-data vehicle shall be operated and tested as follows:

(i) *Gasoline-fueled.* (A) The manufacturer shall determine, for each engine family, the mileage at which the engine-system combination is stabilized for emission-data testing. The manufacturer shall maintain, and provide to the Administrator if requested, a record of the rationale used in making this determination. The manufacturer may elect to accumulate 4,000 miles on each test vehicle within an engine family without making a determination. Any vehicle used to represent emission-data vehicle selections under § 86.084-24(b)(1) shall be equipped with an engine and emission control system that has accumulated at least the mileage determined under this paragraph. Fuel economy data generated from certification vehicles selected in accordance with § 86.084-24(b)(1) with engine-system combinations that have accumulated more than 10,000 kilometers (6,200 miles) shall be factored in accordance with § 600.006-82(c). Complete exhaust emission tests shall be conducted for each emission-data vehicle selection under § 86.084-24(b)(1). The Administrator may determine under § 86.084-24(f) that no testing is required.

(B)-(C) [Reserved]

(ii) *Diesel.* (A) The manufacturer shall determine, for each engine family, the mileage at which the engine-system combination is stabilized for emission-data testing. The manufacturer shall maintain, and provide to the Administrator if requested, a record of the rationale used in making this determination. The manufacturer may elect to accumulate 4,000 miles on each test vehicle within an engine family without making a determination. Any vehicle used to represent emission-data vehicle selections under § 86.084-24(b)(1) shall be equipped with an engine and emission control system that has accumulated

at least the mileage determined under this paragraph. Fuel economy data generated from certification vehicles selected in accordance with § 86.084-24(b)(1) with engine-system combinations that have accumulated more than 10,000 kilometers (6,200 miles) shall be factored in accordance with § 600.006-82(c). Complete exhaust emission tests shall be conducted for each emission-data vehicle selection under § 86.084-24(b)(1). The Administrator may determine under § 86.084-24(f) that no testing is required.

(B)-(C) [Reserved]

(iii) [Reserved]

(iv) All tests required by this subpart on durability-data vehicles shall be conducted within 250 miles of each of the test points.

(c)(1) Paragraph (c) of this section applies to heavy-duty engines.

(2) There are two types of service accumulation applicable to heavy-duty engines:

(i) Service accumulation on engines, subsystems, or components selected by the manufacturer under § 86.084-24(c)(3)(i). The manufacturer determines the form and extent of this service accumulation, consistent with good engineering practice, and describes it in the application for certification.

(ii) Dynamometer service accumulation on emission-data engines selected under § 86.084-24(b)(2) or § 86.084-24(b)(3). The manufacturer determines the engine operating schedule to be used for dynamometer service accumulation, consistent with good engineering practice. A single engine operating schedule shall be used for all engines in an engine family-control system combination. Operating schedules may be different for different combinations.

(3) Exhaust emission deterioration factors will be determined on the basis of the service accumulation described in paragraph (b)(2)(i) of this section and related testing, according to the manufacturer's procedures.

(4) The manufacturer shall determine, for each engine family, the number of hours at which the engine system combination is stabilized for emission-data testing. The manufacturer shall maintain, and provide to the Administrator if requested a record of the rationale used in making this determination. The manufacturer may elect to accumulate 125 hours on each test engine within an engine family without making a determination. Any engine used to represent emission-data engine selections under § 86.084-24 (b)(2) shall be equipped with an engine system combination that has accumulated at least the number of hours determined under this paragraph. Complete exhaust emission tests shall be conducted for each emission-data engine selection under § 86.084-24(b)(2). Evaporative emission controls need not be connected provided normal operating conditions are maintained in the engine induction system. The Administrator may determine under § 86.084(f) that no testing is required.

(d)(1) Paragraph (d) of this section applies to both light-duty trucks and heavy-duty engines.

(2)(i) The results of all emission testing shall be supplied to the Administrator. The manufacturer shall furnish to the Administrator explanation for voiding any test. The Administrator will determine if voiding the test was appropriated based upon the explanation given by the manufacturer for the voided test. Tests between test points may be conducted as required by the Administrator. Data from all tests (including voided tests) may be submitted weekly to the Administrator, but shall be air posted or delivered to the Administrator within 7 days after completion of the tests. In addition, all test data shall be compiled and provided to the Administrator in accordance with § 86.084-23. Where the Administrator conducts a test on a durability-data vehicle at a prescribed test point, the results of that test will be used in the calculation of the deterioration factor.

(ii) The results of all emission tests shall be recorded and reported to the Administrator using two places to the right of the decimal point. These numbers shall be rounded in accordance with the " Rounding Off Method" specified in ASTM E 29-67.

(3) Whenever a manufacturer intends to operate and test a vehicle (or engine) which may be used for emis-

sion data, the manufacturer shall retain in its records all information concerning all emissions tests and maintenance, including vehicle (or engine) alterations to represent other vehicle (or engine) selections. This information shall be submitted, including the vehicle (or engine) description and specification information required by the Administrator, to the Administrator following the emission-data test.

(4)-(5) [Reserved]

(6) Emission testing of any type with respect to any certification vehicle or engine other than that specified in this subpart is not allowed except as such testing may be specifically authorized by the Administrator.

[45 FR 63757, Sept. 25, 1980, as amended by 46 FR 50489, Oct. 13, 1981]

§ 86.084-27 Special test procedures.

(a) For light-duty vehicles and light-duty trucks the Administrator may, on the basis of a written application therefore by a manufacturer, prescribe test procedures, other than those set forth in this part, for any motor vehicle which he determines is not susceptible to satisfactory testing by the procedures set forth herein or in Subpart B of this part.

(b) For heavy-duty engines:

(1) The Administrator may, on the basis of a written application by a manufacturer, prescribe test procedures, other than those set forth in this subpart, for any motor-vehicle engine, which he determines is not susceptible to satisfactory testing by the procedures set forth herein or in Subparts N, I, and P of this part.

(2) If the manufacturer does not submit a written application for use of special test procedures but the Administrator determines that a motor-vehicle engine is not susceptible to satisfactory testing by the procedures set forth herein, the Administrator will reject the applicable portions of the application. The Administrator shall notify the manufacturer in writing and set forth the reasons for such rejection in accordance with the provisions of § 86.084-22(c).

[45 FR 4161, Jan. 21, 1980]

§ 86.084-28 Compliance with emission standards.

(a)(1) Paragraph (a) of this section applies to light-duty vehicles.

(2) The applicable exhaust and fuel evaporative emission standards of this subpart apply to the emissions of vehicles for their useful life.

(3) Since it is expected that emission control efficiency will change with mileage accumulation on the vehicle, the emission level of a vehicle which has accumulated 50,000 miles will be used as the basis for determining compliance with the standards.

(4) The procedure for determining compliance of a new motor vehicle with exhaust emission standards is as follows, except where specified by paragraph (a)(5) of this section for the Alternative Durability Program:

(i) Separate emission deterioration factors shall be determined from the exhaust emission results of the durability-data vehicle(s) for each engine-system combination. A separate factor shall be established for exhaust HC, exhaust CO, exhaust NO_x, and exhaust particulate (diesel vehicles only) for each engine-system combination. A separate evaporative emission deterioration factor shall be determined for each evaporative emission family-evaporative emission control system combination from the testing conducted by the manufacturer (gasoline-fueled vehicles only).

(A) The applicable results to be used unless excluded by paragraph (a)(4)(i)(A)(*4*) of this section in determining the exhaust emission deterioration factors for each engine-system combination shall be:

(*1*) All valid exhaust emission data from the tests required under § 86.084-26(a)(4) except the zero-mile tests. This shall include the official test results, as determined in § 86.081-29 for all tests conducted on all durability-data vehicles of the combination selected under § 86.084-24(c) (including all vehicles elected to be operated by the manufacturer under § 86.084-24(c)(1)(ii)).

(*2*) All exhaust emission data from the test conducted before the after and scheduled maintenance provided in § 86.084-25.

(3) All exhaust emission data from tests required by maintenance approved under § 86.084-25, in those cases where the Administrator conditioned his approval for the performance of such maintenance on the inclusion of such data in the deterioration factor calculation.

(4) The manufacturer has the option of applying an outlier test point procedure to all completed durability data within its certification testing program for a given model year. The outlier procedure will be specified by the Administrator. For any pollutant, durability-data test points that are identified as outliers shall not be included in the deterioration factors if the manufacturer has elected this option. The manufacturer shall specify to the Administrator, before the certification of the first engine family for that model year, if it intends to use the outlier procedure. The manufacturer may not change procedures after the first engine family of the model year is certified. Where the manufacturer chooses to apply the outlier procedure to a data set that contains data which was averaged under § 86.084-26(a)(6)(i) the averaging shall be completed prior to applying the outlier procedure.

(B) All applicable exhaust emission results shall be plotted as a function of the mileage on the system, rounded to the nearest mile, and the best fit straight lines, fitted by the method of least squares, shall be drawn through all these data points. The data will be acceptable for use in the calculation of the deterioration factor only if the interpolated 4,000-mile and 50,000-mile points on this line are within the low-altitude standards provided in § 86.083-8 or § 86.083-9, as applicable. Exceptions to this where data are still acceptable are when a best fit straight line crosses an applicable standard but no data points exceeded the standard, or the best fit straight line crosses an applicable standard with a negative slope (then 4,000-mile interpolated point is higher than the 50,000-mile interpolated point) but the 5,000-mile actual data point is below the standard. A multiplicative exhaust emission deterioration factor shall be calculated for each engine-system combination as follows:

Factor = Exhaust emissions interpolated to 50,000 miles divided by exhaust emissions interpolated to 4,000 miles.

These interpolated values shall be carried out to a minimum of four places to the right of the decimal point before dividing one by the other to determine the deterioration factor. The results shall be rounded to three places to the right of the decimal point in accordance with ASTM E 29-67.

(C) An evaporative emissions deterioration factor (gasoline-fueled vehicles only) shall be determined from the testing conducted as described in § 86.084-21(b)(4)(i), for each evaporative emission family-evaporative emission control system combination to indicate the evaporative emission level at 50,000 miles relative to the evaporative emission level at 4,000 miles as follows:

Factor = Evaporative emission level at 50,000 miles minus the evaporative emission level at 4,000 miles.

The factor shall be established to a minimum of two places to the right of the decimal.

(ii)(A) The official exhaust emission test results for each emission-data vehicle at the selected test point shall be multiplied by the appropriate deterioration factor: *Provided:* That if a deterioration factor as computed in paragraph (a)(4)(i)(B) of this section is less than one, that deterioration factor shall be one for the purposes of this paragraph.

(B) The official evaporative emission test results (gasoline-fueled vehicles only) for each evaporative emission-data vehicle at the selected test point shall be adjusted by addition of the appropriate deterioration factor: *Provided:* That if a deterioration factor as computed in paragraph (a)(4)(i)(C) of this section is less than zero, that deterioration factor shall be zero for the purposes of this paragraph.

(iii) The emissions to compare with the standard shall be the adjusted emissions of paragraphs (a)(4)(ii) (A) and (B) of this section for each emission-data vehicle. Before any emission value is compared with the standard, it shall be rounded, in accordance with ASTM E 29-67, to two significant fig-

ures. The rounded emission values may not exceed the standard.

(iv) Every test vehicle of an engine family must comply with the exhaust emission standards, as determined in paragraph (a)(4)(iii) of this section, before any vehicle in that family may be certified.

(v) Every test vehicle of an evaporative emission family must comply with the evaporative emission standard, as determined in paragraph (a)(4)(iii) of this section before any vehicle in that family may be certified.

(5) The procedure to determine the compliance of new motor vehicles in the Alternative Durability Program (described in § 86.081-13) is the same as described in paragraphs (a)(4)(iii) through (a)(4)(v) of this section. For the engine families that are included in the Alternative Durability Program, the exhaust emission deterioration factors used to determine compliance shall be those that the Administrator has approved under § 86.081-13(c). The evaporative emission deterioration factor for each evaporative emission family shall be determined and applied according to paragraph (a)(4) of this section. The procedure to determine the minimum exhaust emission deterioration factors required under § 86.081-13(d) are as follows:

(i) Separate deterioration factors shall be determined from the exhaust emissions results of the durability-data vehicles for each engine family group. A separate factor shall be established for exhaust HC, exhaust CO, and exhaust NO_x for each engine family group. The evaporative emission deterioration factor for each evaporative family will be determined and applied in accordance with the procedure of paragraph (a)(4) of this section.

(ii) The deterioration factors for each engine family group shall be determined by the Administrator using historical durability data from as many as 3 previous model years. These data will consist of deterioration factors generated by durability-data vehicles representing certified engine families and of deterioration factors from vehicles selected under § 86.084-24(h). The Administrator shall determine how these data will be combined for each engine family group.

(A) The test results to be used in the calculation of each deterioration factor to be combined for each engine family group shall be those test results specified in paragraph (a)(4)(i)(A) of this section.

(B) For each durability-data vehicle selected under § 86.083-24(h), all applicable exhaust emission results shall be plotted as a function of the mileage on the system, rounded to the nearest mile, and the best fit straight lines, fitted by the method of least squares, shall be drawn through all these data points. The exhaust deterioration factor for each durability-data vehicle shall be calculated as specified in paragraph (a)(4)(i)(B) of this section.

(C) *Line crossing.* For the purposes of paragraph (a)(5) of this section, line crossing occurs when either of the interpolated 4,000- and 50,000-mile points of the best fit straight line exceeds the applicable emission standard *and* at least one applicable data point exceeds the standard.

(*1*) The Administrator will not accept for certification line-crossing data from preproduction durability-data vehicles selected under § 86.084-24(c)(1), § 86.084-24(h)(2), or (h)(3).

(*2*) The Administrator will not accept for certification line-crossing data from production durability-data vehicles selected under § 86.084-24(h)(1) *unless* the following is true: The 4,000-mile test result multiplied by the engine family group deterioration factor does not exceed the applicable emission standard. The deterioration factors used for this purpose shall be those that were used in the certification of the production vehicle. Manufacturers may calculate this product immediately after the 4,000-mile test of the vehicle. If the product exceeds the applicable standard, the manufacturer may, with the approval of the Administrator, discontinue the vehicle and substitute a new vehicle. The manufacturer may continue the original vehicle, but the data will not be acceptable if line crossing occurs.

(b)(1) Paragraph (b) of this section applies to light-duty trucks.

(2) The exhaust and fuel evaporative emission standards of § 86.084-9 apply

to the emission of vehicles of their useful life.

(3) Since emission control efficiency generally decreases with the accumulation of mileage on the vehicle, deterioration factors will be used in combination with emission-data vehicle test results as the basis for determining compliance with the standards.

(4)(i) Paragraph (b)(4) of this section describes the procedure for determining compliance of a new vehicle with exhaust emission standards, based on deterioration factors supplied by the manufacturer.

(ii) Separate exhaust emission deterioration factors, determined from tests of vehicles, engines, subsystems, or components conducted by the manufacturer, shall be supplied for each engine-system combination. Separate factors shall be established for transient HC, CO, and NO_x, idle CO (gasoline vehicles only), and exhaust particulat (diesel vehicles only).

(iii) For transient HC, CO, and NO_x idle CO (gasoline vehicles only), and exhaust particulate (diesel vehicles only), the official exhaust emission results for each emission-data vehicle at the selected test point shall be adjusted by multiplication by the appropriate deterioration factor. However, if the deterioration factor supplied by the manufacturer is less than one, it shall be one for the purposes of this paragraph.

(iv) The emission values to compare with the standards shall be the adjusted emission values of paragraph (b)(4)(iii) of this section rounded to two significant figures in accordance with ASTM E 29-67 for each emission-data engine.

(5) [Reserved]

(6)(i) Paragraph (b)(6) of this section describes the procedure for determining compliance of a new vehicle with fuel evaporative emission standards. The procedure described here shall be used for all vehicles in all model years.

(ii) The manufacturer shall determine, based on testing described in § 86.084-21(b)(4)(i), and supply an evaporative emission deterioration factor for each evaporative emission family-evaporative emission control system combination. The factor shall be calculated by subtracting the emission level at the selected test point from the emission level at the useful life point.

(iii) The official evaporative emission test results for each evaporative emission-data vehicle at the selected test point shall be adjusted by the addition of the appropriate deterioration factor. However, if the deterioration factor supplied by the manufacturer is less than zero, it shall be zero for the purposes of this paragraph.

(iv) The emission value to compare with the standards shall be the adjusted emission value of paragraph (b)(6)(iii) of this section rounded to two significant figures in accordance with ASTM E 29-67 for each evaporative emission-data vehicle.

(7) Every test vehicle of an engine family must comply with all applicable standards, as determined in paragraph (b)(4)(iv) or (b)(5)(iv) and paragraph (b)(6) of this section, before any vehicle in that family will be certified.

(c)(1) Paragraph (c) of this section applies to heavy-duty engines.

(2) The exhaust emission standards for gasoline-fueled engines in § 86.084-10 or for diesel engines in § 86.084-11 apply to the emissions of engines for their useful life.

(3) Since emission control efficiency generally decreases with the accumulation of service on the engine, deterioration factors will be used in combination with emission-data engine test results as the basis for determining compliance with the standards.

(4)(i) Paragraph (c)(4) of this section describes the procedure for determining compliance of an engine with emission standards, based on deterioration factors supplied by the manufacturer.

(ii) Separate exhaust emission deterioration factors, determined from tests of engines, subsystems, or components conducted by the manufacturer, shall be supplied for each engine-system combination. For gasoline and diesel engines, separate factors shall be established for transient HC, CO, and NO_x. For gasoline-fueled engines, a separate factor shall be established for idle CO. For diesel smoke testing, separate factors shall also be established for the acceleration mode (designated as "A"), the lugging mode

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(designated as "B"), and the peak opacity (designated as "C").

(iii)(A) For transient HC, CO, NO_x (and, in the case of gasoline-fueled engines, for idle CO), the official exhaust emission results for each emission-data engine at the selected test point shall be adjusted by multiplication by the appropriate deterioration factor. However, if the deterioration factor supplied by the manufacturer is less than one, it shall be one for the purposes of this paragraph.

(B) For acceleration smoke ("A"), lugging smoke ("B"), and peak smoke ("C"), the official exhaust emission results for each emission-data engine at the selected test point shall be adjusted by the addition of the appropriate deterioration factor. However, if the deterioration factor supplied by the manufacturer is less than zero, it shall be zero for the purposes of this paragraph.

(iv) The emission values to compare with the standards shall be the adjusted emission values of paragraph (c)(4)(iii) of this section rounded to two significant figures in accordance with ASTM E 29-67 for each emission-data engine.

(5)-(6) [Reserved]

(7) Every test engine of an engine family must comply with all applicable standards, as determined in paragraph (c)(4)(iv) of this section, before any engine in that family will be certified.

[45 FR 63759, Sept. 25, 1980, as amended at 46 FR 50491, Oct. 13, 1981]

§ 86.084-29 Testing by the Administrator.

(a)(1) Paragraph (a) of this section applies to light-duty vehicles and light-duty trucks.

(2) The Administrator may require that any one or more of the test vehicles be submitted to him, at such place or places as he may designate, for the purposes of conducting emissions tests. The Administrator may specify that he will conduct such testing at the manufacturer's facility, in which case instrumentation and equipment specified by the Administrator shall be made available by the manufacturer for test operations. Any testing conducted at a manufacturer's facility pursuant to this paragraph shall be scheduled by the manufacturer as promptly as possible.

(3)(i) Whenever the Administrator conducts a test on a test vehicle, the results of that test shall, unless subsequently invalidated by the Administrator, comprise the official data for the vehicle at the prescribed test point and the manufacturer's data for that prescribed test point shall not be used in determining compliance with emission standards.

(ii) Whenever the Administrator does not conduct a test on a test vehicle at a test point, the manufacturer's test data will be accepted as the official data for that point: *Provided,* that if the Administrator makes a determination based on testing under paragraph (a)(2) of this section, that there is a lack of correlation between the manufacturer's test equipment and the test equipment used by the Administrator, no manufacturer's test data will be accepted for purposes of certification until the reasons for the lack of correlation are determined and the validity of the data is established by the manufacturer, *and further provided,* that if the Administrator has reasonable basis to believe that any test data submitted by the manufacturer is not accurate or has been obtained in violation of any provisions of this part, the Administrator may refuse to accept that data as the official data pending retesting or submission or further information. If the manufacturer conducts more than one test on a vehicle, as authorized under § 86.084-26 (a)(3)(i)(A) or (b)(4)(i)(A), the data from the last test in that series of tests on that vehicle, will constitute the official data.

(iii)(A)(*1*) The Administrator may adjust or cause to be adjusted any adjustable parameter of an emission data vehicle or engine which the Administrator has determined to be subject to adjustment for certification and Selective Enforcement Audit testing in accordance with § 86.084-22(e)(1), to any setting within the physically adjustable range of that parameter, as determined by the Administrator in accordance with § 86.084-22(e)(3)(i), prior to the performance of any tests to determine whether such vehicle or engine conforms to applicable emission stand-

ards, including tests performed by the manufacturer under § 86.084-23(c)(1). However, if the idle speed parameter is one which the Administrator has determined to be subject to adjustment, the Administrator shall not adjust it to a setting which causes a higher engine idle speed than would have been possible within the physically adjustable range of the idle speed parameter on the vehicle before it accumulated any mileage, all other parameters being adjusted identically for the purpose of comparison. The Administrator, in making or specifying such adjustments, will consider the effect of the deviation from the manufacturer's recommended setting on emissions performance characteristics as well as the likelihood that similar settings will occur on in-use light-duty vehicles or light-duty trucks. In determining likelihood, the Administrator will consider factors such as, but not limited to, the effect of the adjustment on vehicle performance characteristics and surveillance information from similar in-use vehicles.

(*2*) For those vehicles or engine parameters which the Administrator has not determined to be subject to adjustment during certification and Selective Enforcement Audit testing in accordance with § 86.084-22(e)(1), the emission-data vehicle presented to the Administrator for testing shall be calibrated within the production tolerances applicable to the manufacturer's specifications to be shown on the vehicle label (see § 86.084-35(a)(1)(iii)(D) or (a)(2)(iii)(D)) as specified in the application for certification. If the Administrator determines that a vehicle is not within such tolerances, the vehicle will be adjusted, at the facility designated by the Administrator, prior to the test and an engineering report shall be submitted to the Administrator describing the corrective action taken. Based on the engineering report, the Administrator will determine if the vehicle will be used as an emission-data vehicle.

(B) If the Administrator determines that the test data developed on an emission-data vehicle under paragraph (a)(3)(i) of this section would cause that vehicle to fail due to excessive 4,000 mile emissions or by application of the appropriate deterioration factor, then the following procedure shall be observed:

(*1*) The manufacturer may request a retest. Before the retest, those vehicle or engine parameters which the Administrator has not determined to be subject to adjustment for certification and Selective Enforcement Audit testing in accordance with § 86.083-22(e)(1) may be readjusted to manufacturer's specification, if these adjustments were made incorrectly prior to the first test. The Administrator may adjust or cause to be adjusted any parameter which the Administrator has determined to be subject to adjustment to any setting within the physically adjustable range of that parameter, as determined by the Administrator in accordance with § 86.084-22(e)(3)(i). However, if the idle speed parameter is one which the Administrator has determined to be subject to adjustment, the Administrator shall not adjust it to a setting which causes a higher engine idle speed than would have been possible within the physically adjustable range of the idle speed parameter on the vehicle before it accumulated any mileage, all other parameters being adjusted identically for the purpose of comparison. Other maintenance or repairs may be performed in accordance with § 86.084-25. All work on the vehicle shall be done at such location and under such conditions as the Administrator may prescribe.

(*2*) The vehicle will be retested by the Administrator and the results of this test shall comprise the official data for the emission-data vehicle.

(iv) If sufficient durability data are not available at the time of any emission test conducted under paragraph (a)(2) of this section to enable the Administrator to determine whether an emission-data vehicle would fail, the manufacturer may request a retest in accordance with the provisions of paragraphs (a)(3)(iii) (A) and (B) of this section. If the manufacturer does not promptly make such request, he shall be deemed to have waived the right to a retest. A request for retest must be made before the manufacturer removes the vehicle from the test premises.

(b)(1) Paragraph (b) of this section applies to heavy-duty engines.

(2) The Administrator may require that any one or more of the test engines be submitted to him, at such place or places as he may designate, for the purpose of conducting emissions tests. The Administrator may specify that he will conduct such testing at the manufacturer's facility, in which case instrumentation and equipment specified by the Administrator shall be made available by the manufacturer for test operations. Any testing conducted at a manufacturer's facility pursuant to this paragraph shall be scheduled by the manufacturer as promptly as possible.

(3)(i) Whenever the Administrator conducts a test on a test engine the results of that test, unless subsequently invalidated by the Administrator, shall comprise the official data for the engine at that prescribed test point and the manufacturer's data for that prescribed test point shall not be used in determining compliance with emission standards.

(ii) Whenever the Administrator does not conduct a test on a test engine at a test point, the manufacturer's test data will be accepted as the official data for that test point: *Provided,* that if the Administrator makes a determination based on testing under paragraph (b)(2) of this section, that there is a lack of correlation between the manufacturer's test equipment and the test equipment used by the Administrator, no manufacturer's test data will be accepted for purposes of certification until the reasons for the lack of correlation are determined and the validity of the data is established by the manufacturer: *And further provided,* that if the Administrator has reasonable basis to believe that any test data submitted by the manufacturer is not accurate or has been obtained in violation of any provision of this part, the Administrator may refuse to accept that data as the official data pending retesting or submission of further information.

(iii)(A)(*1*) The Administrator may adjust or cause to be adjusted any adjustable parameter of an emission-data engine which the Administrator has determined to be subject to adjustment for certification testing in accordance with § 86.084-22(e)(1), to any setting within the physically adjustable range of that parameter, as determined by the Administrator in accordance with § 86.084-22(e)(3)(i), prior to the performance of any tests to determine whether such engine conforms to applicable emission standards, including tests performed by the manufacturer under § 86.084-23(c)(2). However, if the idle speed parameter is one which the Administrator has determined to be subject to adjustment, the Administrator shall not adjust it to a setting which causes a higher engine idle speed than would have been possible within the physically adjustable range of the idle speed parameter on the engine before it accumulated any dynamometer service, all other parameters being identically adjusted for the purpose of the comparison. The Administrator, in making or specifying such adjustments, may consider the effect of the deviation from the manufacturer's recommended setting on emissions performance characteristics as well as the likelihood that similar settings will occur on in-use heavy-duty engines. In determining likelihood, the Administrator may consider factors such as, but not limited to, the effect of the adjustment on engine performance characteristics and surveillance information from similar in-use engines.

(*2*) For those engine parameters which the Administrator has not determined to be subject to adjustment for certification testing in accordance with § 86.084-22(e)(1), the emission-data engine presented to the Administrator for testing shall be calibrated within the production tolerances applicable to the manufacturer's specifications to be shown on the engine label (see § 86.084-35(a)(3)(iii)) as specified in the application for certification. If the Administrator determines that an engine is not within such tolerances, the engine shall be adjusted at the facility designated by the Administrator prior to the test and an engineering report shall be submitted to the Administrator describing the corrective action taken. Based on the engineering report, the Administrator

will determine if the engine shall be used as an emission-data engine.

(B) If the Administrator determines that the test data developed under paragraph (b)(3)(iii)(A) of this section would cause the emission-data engine to fail due to excessive 125-hour emission values or by the application of the appropriate deterioration factor, then the following procedure shall be observed:

(*1*) The manufacturer may request a retest. Before the retest, those engine parameters which the Administrator has not determined to be subject to adjustment for certification testing in accordance with § 86.084-22(e)(1) may be readjusted to the manufacturer's specification, if these adjustments were made incorrectly prior to the first test. The Administrator may adjust or cause to be adjusted any parameter which the Administrator has determined to be subject to adjustment in accordance with § 86.084-22(e)(3)(i). However, if the idle speed parameter is one which the Administrator has determined to be subject to adjustment, the Administrator shall not adjust it to a setting which causes a higher engine idle speed than would have been possible within the physically adjustable range of the idle speed parameter on the engine before it accumulated any dynamometer service, all other parameters being identically adjusted for the purpose of the comparison. Other maintenance or repairs may be performed in accordance with § 86.084-25. All work on the vehicle shall be done at such location and under such conditions as the Administrator may prescribe.

(*2*) The engine will be retested by the Administrator and the results of this test shall comprise the official data for the emission-data engine.

(iv) If sufficient durability data are not available at the time of any emission test conducted under paragraph (b)(2) of this section to enable the Administrator to determine whether and emission-data engine would fail, the manufacturer may request a retest in accordance with the provisions of paragraph (b)(3)(iii)(B) (*1*) and (*2*) of this section. If the manufacturer does not promptly make such request, he shall be deemed to have waived the right to a retest. A request for retest must be made before the manufacturer removes the engine from the test premises.

[45 FR 63761, Sept. 25, 1980]

§ 86.084-30 Certification.

(a)(1) If, after a review of the test reports and data submitted by the manufacturer, data derived from any inspection carried out under § 86.078-7(c), and any other pertinent data or information, the Administrator determines that a test vehicle(s) (or test engine(s)) meet(s) the requirements of the Act and of this subpart, he will issue a certificate of conformity with respect to such vehicle(s) (or engine(s)) except in cases covered by paragraph (c) of this section.

(2) Such certificate will be issued for such period not to exceed one model year as the Administrator may determine and upon such terms as he may deem necessary or appropriate to assure that any new motor vehicle (or new motor vehicle engine) covered by the certificate will meet the requirements of the Act and of this part.

(3) One such certificate will be issued for each engine family. For gasoline-fueled light-duty vehicles and light-duty trucks, one such certificate will be issued for each engine family-evaporative emission family combination. Each certificate will certify compliance with no more than one set of standards.

(4) The adjustment or modification of any light-duty vehicle or light-duty truck in accordance with instructions provided by the manufacturer as approved by EPA for the altitude where the vehicle is principally used, will not be considered a violation of section 203(a)(3) of the Clean Air Act.

(5) For the purpose of this subpart, "designated high-altitude location" is any county which has substantially all of its area located above 1,219 meters (4,000 feet) and which is identified below:

COUNTIES LOCATED SUBSTANTIALLY ABOVE 1,219 METERS (4,000 FEET) IN ELEVATION

State of Arizona

Apache	Navajo

State of Colorado

Adams	Jefferson
Alamosa	Lake
Arapahoe	La Plata
Archuleta	Larimer
Boulder	Las Animas
Chaffee	Lincoln
Clear Creek	Mesa
Conejos	Mineral
Costilla	Moffat
Crowley	Montezuma
Custer	Montrose
Delta	Morgan
Denver	Ouray
Dolores	Park
Douglas	Pitkin
Eagle	Pueblo
Elbert	Rio Blanco
El Paso	Rio Grande
Fremont	Routt
Garfield	Saguache
Gilpin	San Juan
Grand	San Miguel
Gunnison	Summit
Hinsdale	Teller
Huerfano	Washington
Jackson	Weld

State of Idaho

Bannock	Custer
Bear Lake	Franklin
Bingham	Fremont
Blaine	Jefferson
Bonneville	Madison
Butte	Minidoka
Camas	Oneida
Caribou	Power
Cassia	Teton
Clark	Valley

State of Montana

Beaverhead	Madison
Deer Lodge	Meager
Gallatin	Park
Jefferson	Silver Bow
Judith Basin	Wheatland
Powell	

State of Nebraska

Banner	Kimball
Cheyenne	Sioux

State of Nevada

Carson City	Eureka
Douglas	Humboldt
Elko	Lincoln
Esmeralda	Nye
Lander	White Pine
Lyon	Pershing
Mineral	Washoe
Storey	

State of New Mexico

Bernalillo	Mora
Catron	Rio Arriba
Colfax	Sandoval
Curry	San Juan
De Baca	San Miguel
Grant	Santa Fe
Guadalupe	Sierra
Harding	Socorro
Hidalgo	Roosevelt
Lincoln	Taos
Los Alamos	Torrance
Luna	Union
McKinley	Valencia
Otero	

State of Oregon

Harney	Klamath
Lake	

State of Texas

Jeff Davis	Parmer
Hudspeth	

State of Utah

Beaver	Morgan
Box Elder	Piute
Cache	Rich
Carbon	Salt Lake
Daggett	San Juan
Davis	Sanpete
Duchesne	Sevier
Emery	Summit
Garfield	Tooele
Grand	Uintah
Iron	Utah
Juab	Wasatach
Kane	Wayne
Millard	Weber

State of Wyoming

Albany	Natrona
Campbell	Washakie
Carbon	Niobrara
Converse	Park
Fremont	Platte
Goshen	Sublette
Hot Springs	Sweetwater
Johnson	Teton
Laramie	Uinta
Lincoln	Weston

(6) The provisions of paragraph (a)(4) of this section shall not apply to any light-duty vehicle or light-duty truck sold, offered for sale, introduced, or delivered for introduction into commerce in California provided that the vehicle is covered by a certificate of

conformity with emission standards in effect in California.

(7) Catalyst-equipped vehicles, otherwise covered by certificate, which are driven outside the United States, Canada, and Mexico will be presumed to have been operated on leaded gasoline resulting in deactivation of the catalysts. If these vehicles are imported or offered for importation without retrofit of the catalyst, they will be considered not to be within the coverage of the certificate unless included in a catalyst control program operated by a manufacturer or a United States Government agency and approved by the Administrator.

(8) For incomplete light-duty trucks, a certificate covers only those new motor vehicles which, when completed by having the primary load-carrying device or container attached, conform to the maximum curb weight and frontal area limitations described in the application for certification as required in § 86.084-21(d).

(9) For heavy-duty engines, a certificate covers only those new motor vehicle engines installed in heavy-duty vehicles which conform to the minimum gross vehicle weight rating, curb weight, or frontal area limitations for heavy-duty vehicles described in § 86.082-2.

(b)(1) The Administrator will determine whether a vehicle (or engine) covered by the application complies with applicable standards by observing the following relationships:

(i) *Light-duty vehicles.* (A) The durability-data vehicle(s) selected under § 86.084-24(c)(1)(i) shall represent all vehicles of the same engine-system combination.

(B) The emission-data vehicle(s) selected under § 86.084-24(b)(1)(ii) through (b)(1)(iv) shall represent all vehicles of the same engine-system combination as applicable.

(C) The emission-data vehicle(s) selected under § 86.084-24 (b)(1)(vii)(A) and (b)(1)(vii)(B) shall represent all vehicles of the same evaporative control system within the evaporative family.

(D) The emission-data vehicle(s) selected under § 86.084-24(b)(1)(v) shall represent all vehicles of the same engine-system combination to be sold at high altitude.

(E) The emission-data vehicle(s) selected under § 86.084-24(b)(1)(vii)(D) shall represent all vehicles of the same evaporative control system within the evaporative family sold at high altitude.

(ii) *Light-duty trucks.* (A) [Reserved]

(B) The emission-data vehicle(s) selected under § 86.084-24(b)(1)(ii), shall represent all vehicles of the same engine-system combination as applicable.

(C) The emission-data vehicle(s) selected under § 86.084-24 (b)(1)(vii)(A) and (b)(1)(vii)(B) shall represent all vehicles of the same evaporative control system within the evaporative family.

(D) The emission-data vehicle(s) selected under § 86.084-24(b)(1)(v) shall represent all vehicles of the same evaporative control system within the evaporative family sold at high altitude.

(E) The emission-data vehicle(s) selected under § 86.084-24(b)(1)(vii)(D) shall represent all vehicles of the same evaporative control system within the evaporative family sold at high altitude.

(iii) *Heavy-duty engines.* (A) A gasoline-fueled emission-data test engine selected under § 86.080-24(b)(2) (ii) and (iv) shall represent all engines in the same family of the same engine displacement-exhaust emission control system combination.

(B) A gasoline-fueled emission-data test engine selected under § 86.080-24(b)(2)(iii) shall represent all engines in the same engine family of the same engine displacement-exhaust emission control system combination.

(C) A diesel emission-data test engine selected under § 86.084-24(b)(3)(ii) shall represent all engines in the same engine-system combination.

(D) A diesel emission-data test engine selected under § 86.084-24(b)(3)(iii) shall represent all engines of that emission control system at the rated fuel delivery of the test engine.

(2) The Administrator will proceed as in paragraph (a) of this section with respect to the vehicles (or engines) belonging to an engine family or engine

family-evaporative emission family combination (as applicable), all of which comply with all applicable standards.

(3) If, after a review of the test reports and data submitted by the manufacturer, data derived from any additional testing conducted pursuant to § 86.084-29, data or information derived from any inspection carried out under § 86.078-7(c) or any other pertinent data or information, the Administrator determines that one or more test vehicles (or test engines) of the certification test fleet do not meet applicable standards, he will notify the manufacturer in writing, setting forth the basis for his determination. Within 30 days following receipt of the notification, the manufacturer may request a hearing on the Administrator's determination. The request shall be in writing, signed by an authorized representative of the manufacturer and shall include a statement specifying the manufacturer's objections to the Administrator's determination and data in support of such objections. If, after a review of the request and supporting data, the Administrator finds that the request raises a substantial factual issue, he shall provide the manufacturer a hearing in accordance with § 86.078-6 with respect to such issue.

(4) For light-duty vehicles and light-duty trucks the manufacturer may, at his option, proceed with any of the following alternatives with respect to an emission-data vehicle determined not in compliance with all applicable standards for which it was tested:

(i) Request a hearing under § 86.078-6; or

(ii) Remove the vehicle configuration (or evaporative vehicle configuration, as applicable) which failed, from his application;

(A) If the failed vehicle was tested for compliance with exhaust emission standards only: The Administrator may select, in place of the failed vehicle, in accordance with the selection criteria employed in selecting the failed vehicle, a new emission-data vehicle to be tested for exhaust emission compliance only.

(B) If the failed vehicle was tested for compliance with both exhaust and evaporative emission standards: The Administrator may select, in place of the failed vehicle, in accordance with the selection criteria employed in selecting the failed vehicle, a new emission-data vehicle which will be tested for compliance with both exhaust and evaporative emission standards. If one vehicle cannot be selected in accordance with the selection criteria employed in selecting the failed vehicle, then two vehicles may be selected (i.e., one vehicle to satisfy the exhaust emission vehicle selection criteria and one vehicle to satisfy the evaporative emission vehicle selection criteria). The vehicle selected to satisfy the exhaust emission vehicle selection criteria will be tested for compliance with exhaust emission standards only. The vehicle selected to satisfy the evaporative emission vehicle selection criteria will be tested for compliance with both exhaust and evaporative emission standards; or

(iii) Remove the vehicle configuration (or evaporative vehicle configuration, as applicable) which failed from the application and add a vehicle configuration(s) (or evaporative vehicle configuration(s), as applicable) not previously listed. The Administrator may require, if applicable, that the failed vehicle be modified to the new engine code (or evaporative emission code, as applicable) and demonstrate by testing that it meets applicable standards for which it was originally tested. In addition, the Administrator may select, in accordance with the vehicle selection criteria given in § 86.084-24(b), a new emission-data vehicle or vehicles. The vehicles selected to satisfy the exhaust emission vehicle selection criteria will be tested for compliance with exhaust emission standards only. The vehicles selected to satisfy the evaporative emission vehicle selection criteria will be tested for compliance with both exhaust and evaporative emission standards; or

(iv) Correct a component or system malfunction and show that with a correctly functioning system or component the failed vehicle meets applicable standards for which it was originally tested. The Administrator may require a new emission-data vehicle, of identical configuration (or evaporative

vehicle configuration, as applicable) to the failed vehicle, to be operated and tested for compliance with the applicable standards for which the failed vehicle was originally tested.

(5) For heavy-duty engines the manufacturer may, at his option, proceed with any of the following alternatives with respect to any engine family represented by a test engine(s) determined not in compliance with applicable standards:

(i) Request a hearing under § 86.078-6; or

(ii) Delete from the application for certification the engines represented by the failing test engine. (Engines so deleted may be included in a later request for certification under 86.079-32.) The Administrator may then select in place of each failing engine an alternate engine chosen in accordance with selection criteria employed in selecting the engine that failed; or

(iii) Modify the test engine and demonstrate by testing that it meets applicable standards. Another engine which is in all material respects the same as the first engine, as modified, may then be operated and tested in accordance with applicable test procedures.

(6) If the manufacturer does not request a hearing or present the required data under paragraph (b)(4) or (b)(5) (as applicable) of this section, the Administrator will deny certification.

(c)(1) Not withstanding the fact that any certification vehicle(s) (or certification engine(s)) may comply with other provisions of this subpart, the Administrator may withhold or deny the issuance of a certificate of conformity (or suspend or revoke any such certificate which has been issued) with respect to any such vehicle(s) (or engine(s)) if:

(i) The manufacturer submits false or incomplete information in his application for certification thereof;

(ii) The manufacturer renders inaccurate any test data which he submits pertaining thereto or otherwise circumvents the intent of the Act, or of this part with respect to such vehicle (or enginee);

(iii) Any EPA Enforcement Officer is denied access on the terms specified in § 86.078-7(c) to any facility or portion thereof which contains any of the following:

(A) The vehicle (or engine);

(B) Any components used or considered for use in its modification or buildup into a certification vehicle (or certification engine);

(C) Any production vehicle (or production engine) which is or will be claimed by the manufacturer to be covered by the certificate;

(D) Any step in the construction of a vehicle (or engine) described in (C) of this subdivision;

(E) Any records, documents, reports, or histories required by this part to be kept concerning any of the above;

(iv) Any EPA Enforcement Officer is denied "reasonable assistance" (as defined in § 86.078-7(c)) in examining any of the items listed in paragraph (c)(1)(iii) of this section.

(2) The sanctions of withholding, denying, revoking, or suspending of a certificate may be imposed for the reasons in paragraphs (c)(1)(i), (ii), (iii), or (iv) of this section only when the infraction is substantial.

(3) In any case in which a manufacturer knowingly submits false or inaccurate information or knowingly renders inaccurate or invalid any test data or commits any other fraudulent acts and such acts contribute substantially to the Administrator's decision to issue a certificate of conformity, the Administrator may deem such certificate void ab initio.

(4) In any case in which certification of a vehicle (or engine) is proposed to be withheld, denied, revoked, or suspended under paragraph (c)(1)(iii) or (c)(1)(iv) of this section, and in which the Administrator has presented to the manufacturer involved reasonable evidence that a violation of § 86.078-7(c) in fact occurred, the manufacturer, if he wishes to contend that, even though the violation occurred, the vehicle (or engine) in question was not involved in the violation to a degree that would warrant withholding denial, revocation, or suspension of certification under either paragraph (c)(1)(iii) or (c)(1)(iv) of this section, shall have the burden of establishing that contention to the satisfaction of the Administrator.

(5) Any revocation or suspension of certification under paragraph (c)(1) of this section shall:

(i) Be made only after the manufacturer concerned has been offered an opportunity for a hearing conducted in accordance with § 86.078-6 hereof.

(ii) Extend no further than to forbid the introduction into commerce of vehicles (or engines) previously covered by the certification which are still in the hands of the manufacturer, except in cases of such fraud or other misconduct as makes the certification invalid ab initio.

(6) The manufacturer may request in the form and manner specified in paragraph (b)(3) of this section that any determination made by the Administrator under paragraph (c)(1) of this section to withhold or deny certification be reviewed in a hearing conducted in accordance with § 86.078-6. If the Administrator finds, after a review of the request and supporting data, that the request raise a substantial factual issue, he will grant the request with respect to such issue.

(d)(1) *For light-duty vehicles.* Notwithstanding the fact that any vehicle configuration or engine family may be covered by a valid outstanding certificate of conformity, the Administrator may suspend such outstanding certificate of configuration in whole or in part with respect to such vehicle configuatrion or engine family if:

(i) The manufacturer refuses to comply with the provisions of a test order issued by the Administrator pursuant to § 86.603; or

(ii) The manufacturer refuses to comply with any of the requirements of § 86.603; or

(iii) The manufacturer submits false or incomplete information in any report or information provided pursuant to the requirements of § 86.609; or

(iv) The manufacturer renders inaccurate any test data which he submits pursuant to § 86.609; or

(v) Any EPA Enforcement Officer is denied access to a facility on the terms specified in § 86.606; or

(vi) Any EPA Enforcement Officer is denied the opportunity on the terms specified in § 86.606, to:

(A) Monitor vehicle selection pursuant to § 86.607, or

(B) Select vehicles for testing pursuant to § 86.607, or

(C) Monitor vehicle testing performed to satisfy any of the requirements of this part; or

(vii) Any EPA Enforcement Officer is denied "reasonable assistance" as defined in § 86.606 in examining any of the items listed in that section; or

(viii) The manufacturer refuses to comply with the requirements of §§ 86.604(a), 86.605, and 86.607, 86.608, 86.610, or 86.611.

(2) The sanction of suspending a certificate may not be imposed for the reasons in paragraphs (d)(1)(i), (ii), or (viii) of this section where such refusal is caused by conditions and circumstances outside the control of the manufacturer which renders it impossible to comply with those requirements. Such conditions and circumstances shall include, but not be limited to, any uncontrollable factors which results in the temporary unavailability of equipment and personnel needed to conduct the required tests, such as equipment breakdown or failure or illness of personnel, but shall not include failure of the manufacturer to adequately plan for and provide the equipment and personnel needed to conduct the tests. The manufacturer will bear the burden of establishing the presence of the conditions and circumstances required by this paragraph.

(3) The sanctions of suspending a certificate may be imposed for the reasons in paragraphs (d)(1)(iii), (iv), (v), (vi), or (vii) of this section only when the infraction is substantial.

(4) In any case in which a manufacturer knowingly submitted false or inaccurate information or knowingly rendered inaccurate any test data or committed any other fraudulent acts, and such acts contributed substantially to the Administrator's original decision not to suspend or revoke a certificate of conformity in whole or in part, the Administrator may deem such certificate void from the date of such fraudulent act.

(5) In any case in which certification of a vehicle is proposed to be suspended under paragraph (d)(1)(v), (d)(1)(vi), or (d)(1)(vii) of this section, and in which the Administrator has

presented to the manufacturer involved reasonable evidence that a violation of § 86.606 in fact occurred, the manufacturer, if he wishes to contend that even though the violation occurred, the vehicle configuration or engine family in question was not involved in the violation to the degree that would warrant suspension of certification under either paragraph (d)(1)(v), (d)(1)(vi), or (d)(1)(vii) of this section, shall have the burden of establishing that contention to the satisfaction of the Administrator.

(6) Any suspension of certification under paragraph (d)(1) of this section shall:

(i) Be made only after the manufacturer concerned has been offered an opportunity for a hearing conducted in accordance with § 86.613 hereof, and

(ii) Not apply to vehicles no longer in the hands of the manufacturer.

(e) *For light-duty trucks and heavy-duty engines.* (1) Notwithstanding the fact that any vehicle configuration or engine family may be covered by a valid outstanding certificate of conformity, the Administrator may suspend such outstanding certificate of conformity in whole or in part with respect to such vehicle or engine configuration or engine family if:

(i) The manufacturer refuses to comply with the provisions of a test order issued by the Administrator pursuant to § 86.1003; or

(ii) The manufacturer refuses to comply with any of the requirements of § 86.1003; or

(iii) The manufacturer submits false or incomplete information in any report or information provided pursuant to the requirements of § 86.1009; or

(iv) The manufacturer renders inaccurate any test data submitted pursuant to § 86.1009; or

(v) Any EPA Enforcement Officer is denied the opportunity to conduct activities related to entry and access as authorized in § 86.1006 of this part and in a warrant or court order presented to the manufacturer or the party in charge of a facility in question; or

(vi) EPA Enforcement Officers are unable to conduct activities related to entry and access as authorized in § 86.1006 of this part because a manufacturer has located a facility in a foreign jurisdiction where local law prohibits those activities; or

(vii) The manufacturer refuses to or in fact does not comply with the requirements of §§86.1004(a), 86.1005, 86.1007, 86.1008, 86.1010, 86.1011, or 86.1013.

(2) The sanction of suspending a certificate may not be imposed for the reasons in paragraphs (e)(1)(i), (ii), or (vii) of this section where such refusal or denial is caused by conditions and circumstances outside the control of the manufacturer which renders it impossible to comply with those requirements. Such conditions and circumstances shall include, but are not limited to, any uncontrollable factors which result in the temporary unavailability of equipment and personnel needed to conduct the required tests, such as equipment breakdown or failure or illness of personnel, but shall not include failure of the manufacturers to adequately plan for and provide the equipment and personnel needed to conduct the tests. The manufacturer will bear the burden of establishing the presence of the conditions and circumstances required by this paragraph.

(3) The sanction of suspending a certificate may be imposed for the reasons outlined in paragraph (e)(1) (iii), (iv), or (v) of this section only when the infraction is substantial.

(4) In any case in which a manufacturer knowingly submitted false or inaccurate information or knowingly rendered inaccurate any test data or committed any other fraudulent acts, and such acts contributed substantially to the Administrator's original decision not to suspend or revoke a certificate of conformity in whole or in part, the Administrator may deem such certificate void from the date of such fraudulent act.

(5) In any case in which certification of a light-duty truck or heavy-duty engine is proposed to be suspended under paragraph (e)(1)(v) of this section and in which the Administrator has presented to the manufacturer involved reasonable evidence that a violation of § 86.1006 in fact occurred, if

the manufacturer wishes to contend that, although the violation occurred, the vehicle or engine configuration or engine family in question was not involved in the violation to a degree that would warrant suspension of certification under paragraph (e)(1)(v) of this section, he shall have the burden of establishing that contention to the satisfaction of the Administrator.

(6) Any suspension of certification under paragraph (e)(1) of this section shall:

(i) Be made only after the manufacturer concerned has been offered an opportunity for a hearing conducted in accordance with § 86.1014 and

(ii) Not apply to vehicles or engines no longer in the hands of the manufacturer.

(7) Any voiding of a certificate of conformity under paragraph (e)(4) of this section shall be made only after the manufacturer concerned has been offered an opportunity for a hearing conducted in accordance with § 86.1014.

[45 FR 63763, Sept. 25, 1980, as amended at 46 FR 50491, Oct. 13, 1981]

§ 86.084-35 Labeling.

(a) The manufacturer of any motor vehicle (or motor vehicle engine) subject to the applicable emission standards of this subpart, shall, at the time of manufacture,, affix a permanent legible label, of the type and in the manner described below, containing the information hereinafter provided, to all production models of such vehicles (or engines) available for sale to the public and covered by a certificate of conformity under § 86.084-30(a).

(1) *Light-duty vehicles.* (i) A permanent, legible label shall be affixed in a readily visible position in the engine compartment.

(ii) The label shall be affixed by the vehicle manufacturer who has been issued the certificate of conformity for such vehicle, in such a manner that it cannot be removed without destroying or defacing the label. The label shall not be affixed to any equipment which is easily detached from such vehicle.

(iii) The label shall contain the following information lettered in the English language in block letters and numerals, which shall be of a color that contrasts with the background of the label:

(A) The label heading: Vehicle Emission Control Information;

(B) Full corporate name and trademark of manufacturer;

(C) Engine displacement (in cubic inches), engine, family identification and evaporative family identification;

(D) Engine tune-up specifications and adjustments, as recommended by the manufacturer in accordance with the applicable high or low altitude emission standards, including but not limited to idle speed(s), ignition timing, the idle air-fuel mixture setting procedure and value (e.g., idle CO, idle air-fuel ratio, idle speed drop), high idle speed, initial injection timing, and valve lash (as applicable), as well as other parameters deemed necessary by the manufacturer. These specifications should indicate the proper transmission position during tune-up and what accessories (e.g., air conditioner), if any, should be in operation. If adjustments or modifications to the vehicle are necessary to insure compliance with either the emission standards at low altitude or the optional emission standards at high altitude, the manufacturer shall either include the instructions for such adjustments on the label, or indicate on the label where instructions for such adjustments may be found. The label shall indicate whether the engine tune-up or adjustment specifications are applicable to elevation below or above 4,000 feet.

(E) An unconditional statement of compliance with the appropriate model year U.S. Environmental Protection Agency regulations which apply to light-duty vehicles;

(F) For vehicles which demonstrate compliance with the optional high-altitude standards, a statement indicating that the vehicle was sold to the ultimate purchaser for principal use at high altitude.

(2) *Light-duty trucks.* (i) A legible, permanent label shall be affixed in a readily visible position in the engine compartment.

(ii) The label shall be affixed by the vehicle manufacturer who has been issued the certificate of conformity for such vehicle, in such a manner that it

cannot be removed without destroying or defacing the label. The label shall not be affixed to any equipment which is easily detached from such vehicle.

(iii) The label shall contain the following information lettered in the English language in block letters and numerals, which shall be of a color that contrasts with the background of the label.

(A) The label heading: Important Vehicle Information;

(B) Full corporate name and trademark of manufacturers;

(C) Engine displacement (in cubic inches) and engine family identification;

(D) Engine tune-up specifications and adjustments, as recommended by the manufacturer in accordance with the applicable high or low altitude emission standards, including but not limited to idle speed(s), ignition timing, the idle air-fuel mixture setting procedure and value (e.g., idle CO, idle air-fuel ratio, idle speed drop), high idle speed, initial injection timing, and valve lash (as applicable), as well as other parameters deemed necessary by the manufacturer. These specifications should indicate the proper transmission position during tune-up and what accessories (e.g., air conditioner), if any, should be in operation. If adjustments or modifications to the vehicle are necessary to insure compliance with either the emission standards at low altitude or the optional emission standards at high altitude, the manufacturer shall either include the instructions for such adjustments on the label, or indicate on the label where instructions for such adjustments may be found. The label shall indicate whether the engine tune-up or adjustment specifications are applicable to elevation below or above 4,000 feet.

(E) The prominent statement: "(Manufacturer's corporate name) has determined this vehicle has an average useful life of —— miles or —— hours of operation, whichever occurs first." The manufacturer may alter this statement only to express the useful life in terms other than miles or hours (e.g., years, or hours only).

(F) The subordinate addition to the statement in paragraph (a)(2)(iii)(E) of this section: "This engine's actual life may vary depending on its service application. (For additional information see the owner's maintenance instructions.) This engine conforms to U.S. EPA regulations applicable to 19— Model Year New Heavy-Duty Engines for its useful life."

(G) For vehicles which demonstrate compliance with the optional high-altitude standards, a statement indicating that the vehicle was sold to the ultimate purchaser for principal use at high altitude.

(3) *Heavy-duty engines.* (i) A permanent legible label shall be affixed to the engine in a position in which it will be readily visible after installation in the vehicle.

(ii) The label shall be attached to an engine part necessary for normal engine operation and not normally requiring replacement during engine life.

(iii) The label shall contain the following information lettered in the English language in block letters and numerals, which shall be of a color that contrasts with the background of the label:

(A) The label heading: Important Engine Information;

(B) Full corporate name and trademark of manufacturers;

(C) Engine displacement (in cubic inches) and engine family and model designations;

(D) Date of engine manufacture (month and year);

(E) Engine specifications and adjustments as recommended by the manufacturer. These specifications should indicate the proper transmission position during tune-up and what accessories (e.g., air conditioner), if any, should be in operation;

(F) For gasoline-fueled engines the label should include the idle speed, ignition timing, and the idle air-fuel mixture setting procedure and value (e.g., idle CO, idle air-fuel ratio, idle speed drop), and valve lash.

(G) For diesel engines the label should include the advertised hp at rpm, fuel rate at advertised hp in mm^3 stroke, valve lash, initial injection timing, and idle speed.

(H) The prominent statement: "(Manufacturer's corporate name) has

determined that this engine has an average useful life of —— miles or —— hours of operation, whichever occurs first." The manufacturer may alter this statement only to express the useful life in terms other than miles or hours (e.g., years, or hours only).

(I) The subordinate addition to the statement in paragraph (a)(3)(iii)(H) of this section: "This engine's actual life may vary depending on its service application. (For additional information see the owner's maintenance instructions.) This engine conforms to U.S. EPA regulations applicable to 19-- Model Year New Heavy-Duty Engines for its useful life."

(iv) The label may be made up of one or more pieces; *Provided*, That all pieces are permanently attached to the same engine or vehicle part as applicable.

(b) The provisions of this section shall not prevent a manufacturer from also reciting on the label that such vehicle (or engine) conforms to any applicable state emission standards for new motor vehicles (or new motor vehicle engines) or any other information that such manufacturer deems necessary for, or useful to, the proper operation and satisfactory maintenance of the vehicle (or engine).

(c)(1) The manufacturer of any light-duty vehicle or light-duty truck subject to the emission standards of this subpart shall, in addition and subsequent to setting forth those statements on the label required by the Department of Transportation (DOT) pursuant to 49 CFR 567.4, set forth on the DOT label or on an additional label located in proximity to the DOT label and affixed as described in 40 CFR 567.4(b), the following information in the English language, lettered in block letters and numerals not less than three thirty-seconds of an inch high, of a color that contrasts with the background of the label:

(i) The Heading: "Vehicle Emission Control Information."

(ii)(A) *For light-duty vehicles*, the statement: "This Vehicle Conforms to U.S. EPA Regulations Applicable to 19— Model Year New Motor Vehicles."

(B) *For light-duty trucks*, the statement: "(Manufacturer's Corporate Name) Has Determined That This Vehicle Has An Average Useful Life Of —— Miles Or —— Hours of Operation, Whichever Occurs First. This Engine's Actual Life May Vary Depending On Its Service Application (For additional information see the owner's maintenance instructions.) This Vehicle Conforms To U.S. EPA Regulations Applicable To 19— Model Year New Motor Vehicles, For Its Useful Life." The manufacturer may alter this statement only to express the useful life in terms other than miles or hours (e.g., years, or hours only).

(iii) One of the following statements, as applicable, in letters and numerals not less than six thirty-seconds of an inch high and of a color that contrasts with the background of the label:

(A) For all vehicles certified as non-catalyst-equipped: "NON-CATALYST"

(B) For all vehicles certified as catalyst-equipped which are included in a manufacturer's catalyst control program for which approval has been given by the Administrator: "CATALYST—APPROVED FOR IMPORT"

(C) For all vehicles certified as catalyst-equipped which are not included in a manufacturer's catalyst control program for which prior approval has been given by the Administrator: "CATALYST"

(2) In lieu of selecting either of the labeling options of paragraph (c)(1) of this section, the manufacturer may add the information required by paragraph (c)(1)(iii) of this section to the label required by paragraph (a) of this section. The required information will be set forth in the manner prescribed by paragraph (c)(1)(iii) of this section.

(d)(1) Incomplete light-duty trucks or incomplete heavy-duty vehicles optionally certified as light-duty trucks shall have the following prominent statement printed on the label required in paragraph (a)(2) of this section in lieu of the statement required by paragraph (a)(2)(iii)(E) of this section: "(Manufacturer's Corporate Name) has determined that this vehicle has an average useful life of —— miles or hours of operation, whichever occurs first." The manufacturer may alter this statement only to express the useful life in terms other than

miles or hours (e.g., years, or hours only).

(2) The subordinate addition to the statement in paragraph (d)(1) of this section: "This vehicle's actual life may vary depending on its service application. (For additional information see the owner's maintenance instructions.) This engine conforms to U.S. EPA regulations applicable to 19— Model Year New Heavy-Duty Engines when installed in a vehicle completed at a curb weight of more than 6,000 pounds or with a frontal area greater than 45 square feet for its useful life."

(e)(1) Incomplete heavy-duty vehicles having an 8,500-pound gross vehicle weight rating or less shall have the following prominent statement printed on the label required in paragraph (a)(3) of this section in lieu of the statement required by paragraph (a)(3)(iii)(H) of this section: ("Manufacturer's corporate name) has determined that this engine has an average useful life of —— miles or —— hours of operation, whichever occurs first." The manufacturer may alter this statement only to express the useful life in terms other than miles or hours (e.g., years, or hours only).

(2) In addition, the label shall have the following subordinate statement in lieu of the statement required by paragraph (a)(3)(iii)(I) of this section: "This engine's actual life may vary depending on its service application. (For additional information see the owner's maintenance instructions.) This engine conforms to U.S. EPA regulations applicable to 19— Model Year New Heavy-Duty Engines when installed in a vehicle completed at a curb weight of more than 6,000 pounds or with a frontal area greater than 45 square feet for its useful life."

(f) The manufacturer of any incomplete vehicle shall notify the purchaser such vehicle of any curb weight, frontal area, or gross vehicle weight rating limitations affecting the emission certificate applicable to that vehicle. This notification shall be transmitted in a manner consistent with National Highway Traffic Safety Administration safety notification requirements published in 49 CFR Part 568.

[45 FR 63767, Sept. 25, 1980]

§ 86.084-38 Maintenance instructions.

(a) The manufacturer shall furnish or cause to be furnished to the purchaser of each new motor vehicle (or motor vehicle engine) subject to the standards prescribed in §§ 86.082-8, 86.084-9, 86.084-10, or 86.084-11, as applicable, written instructions for the maintenance and use of the vehicle (or engine) by the purchaser as may be reasonable and necessary to assure the proper functioning of the emission control system.

(1) Such instructions shall be provided for those vehicle and engine components listed in Appendix VI to this part (and for any other components) to the extent that maintenance of these components is necessary to assure the proper functioning of emission control system.

(2) Such instructions shall be in clear, and to the extent practicable, nontechnical language.

(b) The maintenance instructions required by this section shall contain a general description of the documentation which the manufacturer will require from the ultimate purchaser or any subsequent purchaser as evidence of compliance with the instructions.

(c) For gasoline-fueled light-duty vehicles.

(1) Such instructions shall specify the performance of all scheduled maintenance performed by the manufacturer under § 86.084-25(a), and shall explain the conditions under which EGR system and catalytic converter maintenance are to be performed (e.g., what type of warning device is being employed and whether the device is activated by component failure or the need for periodic maintenance).

(d) For diesel light-duty vehicles.

(1) Such instructions shall specify the performance of all scheduled maintenance performed by the manufacturer under § 86.084-25(a) and shall explain the conditions under which EGR system and catalytic converter maintenance are to be performed (e.g., what type of warning device is being employed and whether the device is activated by component failure or the need for periodic maintenance).

(e) *For light-duty trucks.* (1) Maintenance shall specify the performance of all scheduled emission-related maintenance approved by the Administrator under § 86.084-25(b). Scheduled emission-related maintenance in addition to that performed under § 86.084-25(b) may be recommended for reasons such as to offset the effects of operating conditions which differ from the conditions experienced during the determination of deterioration factors. Such additional recommended maintenance shall be clearly differentiated, in a form approved by the Administrator from that approved under § 86.083-25(b). The instructions may schedule maintenance on a calendar time basis, mileage basis, engine service time basis, or combinations of each.

(2) Such instructions shall specify the useful life of the vehicle as determined by the manufacturer under § 86.084-21(b)(4)(ii)(B). This period of use shall be expressed as a period of engine or vehicle operation or as an equivalent vehicle mileage (or both). The manufacturer shall also present the method(s) by which the need for engine rebuild can be determined, including the criteria and values required in § 86.084-21(b)(4)(ii)(C) and the necessary measurement equipment and instrumentation. The manufacturer shall also include in the instructions an explanation of how it determined both the average useful life and the values of the rebuild criteria. An explanation may be included of how the useful life is determined for an individual engine (the first occurring of either the average useful life or the need for rebuild) and of how the actual useful lives of engines used in various applications are expected to differ from the average useful life. The explanation(s) shall be in clear, nontechnical language that is understandable to the ultimate purchaser.

(f) *For heavy-duty engines.* (1) Maintenance instructions shall specify the performance of all scheduled emission-related maintenance approved by the Administrator under § 86.084-25(c). Scheduled emission-related maintenance in addition to that performed under § 86.084-25(b) may be recommended for reasons such as to offset the effects of operating conditions which differ from the conditions experienced during the determination of deterioration factors. Such additional recommended maintenance shall be clearly differentiated, in a form approved by the Administrator from that approved under § 86.084-25(b). The instructions may schedule maintenance on a calendar time basis, mileage basis, engine service time basis, or combinations of each.

(2) Such instructions shall specify the useful life of the engine as determined by the manufacturer under § 86.084-21(b)(4)(ii)(B). This period of use shall be expressed as a period of engine or vehicle operation or as an equivalent vehicle mileage (or both). The manufacturer shall also present the method(s) by which the need for engine rebuild can be determined, including the criteria and values required in § 86.084-21(b)(4)(ii)(C) and the necessary measurement equipment and instrumentation. The manufacturer shall also include in the instructions an explanation of how it determined both the average useful life and the values of the rebuild criteria. An explanation may be included of how the useful life is determined for an individual engine (the first occurring of either the average useful life or the need for rebuild) and of how the actual useful lives of engines used in various applications are expected to differ from the average useful life. The explanation(s) shall be in clear, nontechnical language that is understandable to the ultimate purchaser.

[45 FR 63769, Sept. 25, 1980]

§ 86.084-39 Automatic expiration of reporting and recordkeeping requirements.

(a)—(b) [Reserved]

(c) *Heavy-duty engines.*

(1) All of the recordkeeping and reporting requirements in this subpart for which 1984 is the first model year of implementation shall automatically expire on December 31, 1988, unless the Administrator acts to retain them.

(2) If the Administrator determines that the reporting and recordkeeping requirements should be retained he/she shall also at that time establish the subsequent date of expiration,

which shall not be later than December 31, 1993.

[45 FR 4169, Jan. 21, 1980]

§ 86.084-40 Automatic expiration of reporting and recordkeeping requirements.

(a) [Reserved]

(b) *Light-duty trucks and heavy-duty engines.* (1) All of the recordkeeping and reporting requirements in this subpart for which 1984 is the first model year of implementation will automatically expire on December 31, 1988, unless the Administrator acts to retain them.

(2) If the Administrator determines that the reporting and recordkeeping requirements should be retained she/he will also at that time establish the subsequent date of expiration, which will not be later than December 31, 1993.

[45 FR 63770, Sept. 25, 1980]

§ 86.085-8 Emission standards for 1985 light-duty vehicles.

(a)(1) Exhaust emissions from 1985 and later model year light-duty vehicles shall not exceed:

(i) *Hydrocarbons.* 0.41 gram per vehicle mile (0.255 gram per vehicle kilometer);

(ii) *Carbon monoxide.* 3.4 grams per vehicle mile (2.11 grams per vehicle kilometer);

(iii) *Oxides of nitrogen.* 1.0 gram per vehicle mile (0.62 gram per vehicle kilometer);

(iv) *Particulate emissions* (diesels only). 0.20 gram per vehicle mile (0.124 gram per vehicle kilometer).

(2) The standards set forth in paragraph (a)(1) of this section refer to the exhaust emitted over a driving schedule as set forth in Subpart B of this part and measured and calculated in accordance with those procedures.

(b)(1) Fuel evaporative emissions from 1985 and later model year gasoline-fueled light-duty vehicles shall not exceed:

(i) *Hydrocarbons.* 2.0 grams per test.

(2) The standard set forth in paragraph (b)(1) of this section refers to a composite sample of the fuel evaporative emissions collected under the conditions set forth in Subpart B of this part and measured in accordance with those procedures.

(c) No crankcase emissions shall be discharged into the ambient atmosphere from any 1985 and later model year gasoline-fueled light-duty vehicle.

[45 FR 14505, Mar. 5, 1980]

§ 86.085-9 Emission standards for 1985 light-duty trucks.

(a)(1) Exhaust emissions from 1985 and later model year light-duty trucks shall not exceed:

(i) *Hydrocarbons.* 0.8 gram per vehicle mile (0.5 gram per vehicle kilometer);

(ii)(A) *Carbon Monoxide.* 10 grams per vehicle mile (6.2 grams per vehicle kilometer);

(B) 0.47 percent of exhaust gas flow at curb idle.

(iii) *Oxides of Nitrogen.* 2.3 grams per vehicle mile (1.4 grams per vehicle kilometer);

(iv) *Particulate Emissions (diesels only).* 0.26 gram per vehicle mile (0.162 gram per vehicle kilometer).

(2) The standards set forth in paragraphs (a)(1)(i), (a)(1)(ii)(A), (a)(1)(iii), and (a)(1)(iv) of this section refer to the exhaust emitted over a driving schedule as set forth in Subpart B and measured and calculated in accordance with those procedures. The standard set forth in paragraph (a)(1)(ii)(B) of this section refers to the exhaust emitted at curb idle and measured and calculated in accordance with the procedures set forth in Subpart P of this part.

(b)(1) Fuel evaporative emissions from 1985 and later model year gasoline-fueled light-duty trucks shall not exceed:

(i) *Hydrocarbons.* 2.0 grams per test.

(2) The standard set forth in paragraph (b)(1) of this section refers to a composite sample of the fuel evaporative emissions collected under the conditions set forth in Subpart B and measured in accordance with those procedures.

(c) No crankcase emissions shall be discharged into the ambient atmosphere from any 1985 and later model year light-duty truck.

(d)(1) Model year 1985 and later light-duty trucks sold for principal use

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at designated high-altitude locations shall not exceed the following exhaust emission standards when tested at the high-altitude reference point if the manufacturer of such vehicles elects to demonstrate compliance with the high-altitude standards.

(i) *Hydrocarbons.* 2.0 grams per vehicle mile;

(ii) *Carbon Monoxide.* 26.0 grams per vehicle mile;

(iii) *Oxides of Nitrogen.* 2.3 grams per vehicle mile.

(2) The standards set forth in paragraph (d)(1) of this section refer to the exhaust emitted over a driving schedule as set forth in Subpart B of this part and measured and calculated in accordance with those procedures.

(e)(1) Fuel evaporative emissions from 1985 and later model year gasoline-fueled light-duty trucks sold for principal use at designated high-altitude areas shall not exceed 2.6 grams per test when tested at the high-altitude reference point if the manufacturer of such vehicles elects to demonstrate compliance with high-altitude emission standards.

(2) The standard set forth in paragraph (e)(1) of this section refers to a composite sample of the fuel evaporative emission collected under the conditions set forth in Subpart B of this part and measured in accordance with those procedures.

[45 FR 63770, Sept. 25, 1980]

§ 86.085-11 Emission standards for 1985 and later model year diesel heavy-duty engines.

(a)(1) Exhaust emissions from new 1985 and later model year diesel heavy-duty engines shall not exceed the following:

(i) *Hydrocarbons.* 1.3 grams per brake horsepower hour, as measured under transient operating conditions (Subpart N).

(ii) *Carbon monoxide.* (A) 15.5 grams per brake horsepower hour as measured under transient operating conditions (Subpart N).

(iii) *Oxides of nitrogen.* 10.7 grams per brake horsepower hour, as measured under transient operating conditions (Subpart N).

(2) The standards set forth in paragraph (a)(1) of this section refer to the exhaust over operating schedules as set forth in Subparts N or P and measured and calculated in accordance with those procedures.

(b)(1) The opacity of spoke emissions from new 1984 and later model year diesel heavy-duty engines shall not exceed:

(i) 20 percent during the engine acceleration mode.

(ii) 15 percent during the engine lugging mode.

(iii) 50 percent during the peaks in either mode.

(2) The standards set forth in paragraph (b)(1) of this section refer to exhaust smoke emissions generated under the conditions set forth in Subpart I of this part and measured and calculated in accordance with those procedures.

(c) No crankcase emissions shall be discharged into the ambient atmosphere from any new 1984 model year naturally-aspirated diesel heavy-duty engine. This provision does not apply to turbocharged engines.

(d) Every manufacturer of new motor vehicle engines subject to the standards prescribed in this section shall, prior to taking any of the actions specified in section 203(a)(1) of the Act, test or cause to be tested motor vehicle engines in accordance with applicable procedures in Subparts I, N, or P of this part to ascertain that such test engines meet the requirements of paragraphs (a), (b), and (c) of this section.

[45 FR 4170, Jan. 21, 1980]

§ 86.085-28 Compliance with emission standards.

(a)(1) Paragraph (a) of this section applies to light-duty vehicles.

(2) The applicable exhaust and fuel evaporative emission standards of this subpart apply to the emissions of vehicles for their useful life.

(3) Since it is expected that emission control efficiency will change with mileage accumulation on the vehicle, the emission level of a vehicle which has accumulated 50,000 miles will be used as the basis for determining compliance with the standards.

(4) The procedure for determining compliance of a new motor vehicle

with exhaust emission standards is as follows:

(i) Separate emission deterioration factors shall be determined from the exhaust emission results of the durability-data vehicle(s) for each engine-system combination. A separate factor shall be established for exhaust HC, exhaust CO, exhaust NO_x, and exhaust particulate (diesel vehicles only) for each engine-system combination. A separate evaporative emission deterioration factor shall be determined for each evaporative emission family-evaporative emission control system combination from the testing conducted by the manufacturer (gasoline-fueled vehicles only).

(A) The applicable results to be used unless excluded by paragraph (a)(4)(i)(A)(*4*) of this section in determining the exhaust emission deterioriation factors for each engine-system combination shall be:

(*1*) All valid exhaust emission data from the tests required under § 86.084-26(a)(4) except the zero-mile tests. This shall include the official test results, as determined in § 86.081-29 for all tests conducted on all durability-data vehicles of the combination selected under § 86.084-24(c) (including all vehicles elected to be operated by the manufacturer under § 86.084-24(c)(1)(ii)).

(*2*) All exhaust emission data from the tests conducted before and after the scheduled maintenance provided in § 86.084-25.

(*3*) All exhaust emission data from tests required by maintenance approved under § 86.084-25, in those cases where the Administrator conditioned his approval for the performance of such maintenance on the inclusion of such data in the deterioration factor calculation.

(*4*) The manufacturer has the option of applying an outlier test point procedure to all completed durability-data within its certification testing program for a given model year. The outlier procedure will be specified by the Administrator. For any pollutant, durability-data test points that are identified as outliers shall not be included in the determination of deterioration factors if the manufacturer has elected this option. The manufacturer shall specify to the Administrator, before the certification of the first engine family for that model year, if it intends to use the outlier procedure. The manufacturer may not change procedures after the first engine family of the model year is certified. Where the manufacturer chooses to apply the outlier procedure to a data set that contains data which was averaged under § 86.084-26(a)(6)(i) the averaging shall be completed prior to applying the outlier procedure.

(B) All applicable exhaust emission results shall be plotted as a function of the mileage on the system, rounded to the nearest mile, and the best fit straight lines, fitted by the method of least squares, shall be drawn through all these data points. The data will be acceptable for use in the calculation of the deterioration factor only if the interpolated 4,000-mile and 50,000-mile points on this line are within the low-altitude standards provided in § 86.083-8 or § 86.083-9, as applicable. Exceptions to this where data are still acceptable are when a best fit straight line crosses an applicable standard but no data points exceeded the standard, or the best fit straight lines crosses an applicable standard with a negative slope (the 4,000-mile interpolated point is higher than the 50,000-mile interpolated point) but the 5,000-mile actual data point is below the standard. A multiplicative exhaust emission deterioration factor shall be calculated for each engine-system combination as follows:

Factor = Exhaust emissions interpolated to 50,000 miles divided by exhaust emissions interpolated to 4,000 miles.

These interpolated values shall be carried out to a minimum of four places to the right of the decimal point before dividing one by the other to determine the deterioration factor. The results shall be rounded to three places to the right of the decimal point in accordance with ASTM E 29-67.

(C) An evaporative emissions deterioration factor (gasoline-fueled vehicles only) shall be determined from the testing conducted as described in § 86.084-21(b)(4)(i), for each evaporative emission family-evaporative emis-

sion control system combination to indicate the evaporative emission level at 50,000 miles relative to the evaporative emission level at 4,000 miles as follows:

Factor Evaporative emission level at 50,000 miles minus the evaporative emission level at 4,000 miles.

The factor shall be established to a minimum of two places to the right of the decimal.

(ii)(A) The official exhaust emission test results for each emission-data vehicle at the selected test point shall be multiplied by the appropriate deterioration factor: *Provided:* That if a deterioration factor as computed in paragraph (a)(4)(i)(B) of this section is less than one, that deterioration factor shall be one for the purposes of this paragraph.

(B) The official evaporative emission test results (gasoline-fueled vehicles only) for each evaporative emission-data vehicle at the selected test point shall be adjusted by addition of the appropriate deterioration factor: *Provided:* that if a deterioration factor as computed in paragraph (a)(4)(i)(C) of this section is less than zero, that deterioration factor shall be zero for the purposes of this paragraph.

(iii) The emissions to compare with the standard shall be the adjusted emissions of paragraph (a)(4)(ii) (A) and (B) of this section for each emission-data vehicle. Before any emission value is compared with the standard, it shall be rounded, in accordance with ASTM E 29-67, to two significant figures. The rounded emission values may not exceed the standard.

(iv) Every test vehicle of an engine family must comply with the exhaust emission standards, as determined in paragraph (a)(4)(iii) of this section, before any vehicle in that family may be certified.

(v) Every test vehicle of an evaporative emission family must comply with the evaporative emission standard, as determined in paragraph (a)(4)(iii) of this section before any vehicle in that family may be certified.

(b)(1) Paragraph (b) of this section applies to light-duty trucks.

(2) The exhaust and fuel evaporative emission standards of § 86.085-9 apply to the emissions of vehicles for their useful life.

(3) Since emission control efficiency generally decreases with the accumulation of mileage on the vehicle, deterioration factors will be used in combination with emission-data vehicle test results as the basis for determining compliance with the standards.

(4)(i) Paragraph (b)(4) of this section describes the procedure for determining compliance of a new vehicle with exhaust emission standards, based on deterioration factors supplied by the manufacturer.

(ii) Separate exhaust emission deterioration factors, determined from test of vehicles, engines, subsystems, or components conducted by the manufacturer, shall be supplied for each engine-system combination. Separate factors shall be established for transient HC, CO, and NO_x, idle CO (gasoline vehicles only), and exhaust particulate (diesel vehicles only).

(iii) For transient HC, CO, and NO_x, idle CO (gasoline vehicles only), and exhaust particulate (diesel vehicles only), the official exhaust emission results for each emission-data vehicle at the selected test point shall be adjusted by multiplication by the appropriate deterioration factor. However, if the deterioration factor supplied by the manufacturer is less than one, it shall be one for the purposes of this paragraph.

(iv) The emission values to compare with the standards shall be the adjusted emission values of paragraph (b)(4)(iii) of this section rounded to two significant figures in accordance with ASTM E 29-67 for each emission-data engine.

(5) [Reserved]

(6)(i) Paragraph (b)(6) of this section describes the procedure for determining compliance of a new vehicle with fuel evaporative emission standards. The procedure described here shall be used for all vehicles in all model years.

(ii) The manufacturer shall determine, based on testing described in § 86.084-21(b)(4)(i), and supply an evaporative emission deterioration factor for each evaporative emission family-evaporative emission control system combination. The factor shall

be calculated by subtracting the emission level at the selected test point from the emission level at the useful life point.

(iii) The official evaporative emission test results for each evaporative emission-data vehicle at the selected test point shall be adjusted by the addition of the appropriate deterioration factor. However, if the deterioration factor supplied by the manufacturer is less than zero, it shall be zero for the purposes of this paragraph.

(iv) The emission value to compare with the standards shall be the adjusted emission value of paragraph (b)(6)(iii) of this section rounded to two significant figures in accordance with ASTM E 29-67 for each evaporative emission-data vehicle.

(7) Every test vehicle of an engine family must comply with all applicable standards, as determined in paragraph (b)(4)(iv) or (b)(5)(iv) and paragraph (b)(6) of this section, before any vehicle in that family will be certified.

(c)(1) Paragraph (c) of this section applies to heavy-duty engines.

(2) The exhaust emission standards for gasoline-fueled engines in § 86.084-10 or for diesel engines in § 86.085-11 apply to the emissions of engines for their useful life.

(3) Since emission control efficiency generally decreases with the accumulation of service on the engine, deterioration factors will be used in combination with emission-data engine test results as the basis for determining compliance with the standards.

(4)(i) Paragraph (c)(4) of this section describes the procedure for determining compliance of an engine with emission standards, based on deterioration factors supplied by the manufacturer.

(ii) Separate exhaust emission deterioration factors, determined from tests on engines, subsystems, or components conducted by the manufacturer, shall be supplied for each engine-system combination. For gasoline and diesel engines, separate factors shall be established for transient HC, CO, and NOx. For gasoline-fueled engines, a separate factor shall be established for idle CO. For diesel smoke testing, separate factors shall also be established for the acceleration mode (designated as "A"), the lugging mode (designated as "B"), and the peak opacity (designated as "C").

(iii)(A) For transient HC, CO, NO_x, (and, in the case of gasoline-fueled engines, for idle CO), the official exhaust emission results for each emission-data engine at the selected test point shall be adjusted by multiplication by the appropriate deterioration factor. However, if the deterioration factor supplied by the manufacturer is less than one, it shall be one for the purposes of this paragraph.

(B) For acceleration smoke ("A"), lugging smoke ("B"), and peak smoke ("C"), the official exhaust emission results for each emission-data engine at the selected test point shall be adjusted by the addition of the appropriate deterioration factor. However, if the deterioration factor supplied by the manufacturer is less than zero, it shall be zero for the purposes of this paragraph.

(iv) The emission values to compare with the standards shall be the adjusted emission values of paragraph (c)(4)(iii) of this section rounded to two significant figures in accordance with ASTM E 29-67 for each emission-data engine.

(5)-(6) [Reserved]

(7) Every test engine of an engine family must comply with all applicable standards, as determined in paragraph (c)(4)(iv) of this section, before any engine in that family will be certified.

[45 FR 63770, Sept. 25, 1980, as amended at 46 FR 50492, Oct. 13, 1981]

Subpart B—Emission Regulations for 1977 and Later Model Year New Light-Duty Vehicles and New Light-Duty Trucks; Test Procedures.

SOURCE: 42 FR 32954, June 28, 1977, unless otherwise noted.

§ 86.101 General applicability.

(a) The provisions of this subpart are applicable to 1977 and later model year new light-duty vehicles and light-duty trucks.

(1) Sections 86.101 through 86.145-78 apply for 1978 and later model years.

(2) Sections 86.177-4 through 86.177-23 apply for the 1977 model year only.

(b) Provisions of this subpart apply to tests performed by both the Administrator and motor vehicle manufacturers.

§ 86.102 Definitions.

The definitions in Subpart A apply to this subpart.

[45 FR 14508, Mar. 5, 1980]

§ 86.103 Abbreviations.

The abbreviations in Subpart A apply to this subpart.

[45 FR 14508, Mar. 5, 1980]

§ 86.104 Section numbering; construction.

(a) The model year of initial applicability is indicated by the section number. The two digits following the hyphen designate the first model year for which a section is effective. A section remains effective until superseded.

Example. Section 86.111-78 applies to the 1978 and subsequent model years until superseded. If a § 86.111-81 is promulgated it would take effect beginning with the 1981 model year; § 86.111-78 would apply to model years 1978 through 1980.

(b) Unless indicated otherwise, all provisions in this subpart apply to both gasoline-fueled and Diesel vehicles.

[42 FR 32954, June 28, 1977. Redesignated at 45 FR 14508, Mar. 5, 1980]

§ 86.105 Introduction; structure of subpart.

(a) This subpart describes the equipment required and the procedures to follow in order to perform gaseous exhaust, Diesel particulate, and evaporative emission tests on light-duty vehicles and light-duty trucks. Subpart A sets forth the testing requirements and test intervals necessary to comply with EPA certification procedures.

(b) Three topics are addressed in this subpart. Sections 86.106 through 86.115 set forth specifications and equipment requirements; §§ 86.116 through 86.126 discuss calibration methods and frequency; test procedures and data requirements are listed (in approximate order of performance) in §§ 86.127 through 86.145.

[42 FR 32954, June 28, 1977. Redesignated and amended at 45 FR 14508, Mar. 5, 1980]

§ 86.106-78 Equipment required; overview.

(a) This subpart contains procedures for both exhaust and evaporative emissions tests on Diesel or gasoline-fueled light-duty vehicles and light-duty trucks. Certain items of equipment are not necessary for a particular test, e.g., evaporative enclosure when testing Diesel vehicles. Equipment required and specifications are as follows:

(1) *Evaporative emission tests; gasoline-fueled vehicles.* The evaporative emission test is closely related to and connected with the exhaust emission test. All vehicles tested for evaporative emissions must be tested for exhaust emissions. Further, unless the evaporative emission test is waived by the Administrator under § 86.078-26, all gasoline-fueled vehicles must undergo both tests. (Diesel vehicles are excluded from the evaporative emission standard.) Section 86.107 specifies the necessary equipment.

(2) *Exhaust emission tests.* All vehicles subject to this subpart are tested for exhaust emissions. Diesel and gasoline-fueled vehicles are tested identically with the exception of hydrocarbon measurements; Diesel vehicles require a heated hydrocarbon detector, § 86.109. All gasoline-fueled vehicles are either tested for evaporative emissions or undergo a diurnal heat build. Diesel vehicles are excluded from this requirement. Equipment necessary and specifications appear in §§ 86.108 through 86.114.

(3) *Fuel, analytical gas, and driving schedule specifications.* Fuel specifications for exhaust and evaporative emission testing and for mileage accumulation for gasoline-fueled and Diesel vehicles are specified in § 86.113. Analytical gases are specified in § 86.114. The EPA Urban Dynamometer Driving Schedule for use in exhaust testing is specified in § 86.115 and Appendix I.

§ 86.106-82 Equipment required; overview.

(a) This subpart contains procedures for exhaust emissions tests on light-duty diesel vehicles and light-duty diesel trucks, and exhaust and evapo-

rative emission tests on gasoline-fueled light-duty vehicles and light-duty trucks. Certain items of equipment are not necessary for a particular test, e.g., evaporative enclosure when testing diesel vehicles. Equipment required and specifications are as follows:

(1) *Evaporative emission tests, gasoline-fueled vehicles.* The evaporative emission test is closely related to and connected with the exhaust emission test. All vehicles tested for evaporative emissions must be tested for exhaust emissions. Further, unless the evaporative emission test is waived by the Administrator under § 86.078-26, all gasoline-fueled vehicles must undergo both tests. (Diesel vehicles are excluded from the evaporative emission standard.) Section 86.107 specifies the necessary equipment.

(2) *Exhaust emission tests.* All vehicles subject to this subpart are tested for exhaust emissions. The exhaust from gasoline-fueled vehicles is tested for gaseous emissions only, using the CVS concept (§ 86.109). The exhaust from diesel vehicles is tested for both gaseous and particulate emissions. Diesel testing also utilizes the CVS concept of measuring emissions, but requires that a PDP-CVS or CFV with heat exchanger be used, and that it be connected to a dilution tunnel in order to sample particulate emissions (§ 86.110). All gasoline-fueled vehicles are either tested for evaporative emissions or undergo a diurnal heat build. Diesel vehicles are excluded from this requirement. Equipment necessary and specifications appear in §§ 86.108 through 86.114.

(3) *Fuel, analytical gas, and driving schedule specifications.* Fuel specifications for exhaust and evaporative emissions testing and for mileage accumulation for gasoline-fueled and diesel vehicles are specified in § 86.113. Analytical gases are specified in § 86.114. The EPA Urban Dynamometer Driving Schedule (UDDS) for use in both gasoline-fueled and diesel exhaust emissions tests is specified in § 86.115 and Appendix I.

[45 FR 14508, Mar. 5, 1980]

§ 86.107-78 Sampling and analytical system; evaporative emissions.

(a) Component description (evaporative emissions sampling system). The following components will be used in evaporative emissions sampling systems for testing under this subpart.

(1) *Evaporative emission measurement enclosure.* The enclosure shall be readily sealable, rectangular in shape, with space for personnel access to all sides of the vehicle. When sealed, the enclosure shall be gas tight in accordance with § 86.117. Interior surfaces must be impermeable to hydrocarbons. One surface should be of flexible, impermeable material to allow for minor volume changes, resulting from temperature changes. Wall design should promote maximum dissipation of heat, and if artificial cooling is used, interior surface temperatures shall not be less than 68° F (20° C).

(2) *Evaporative emission hydrocarbon analyzers.* A hydrocarbon analyzer utilizing the hydrogen flame ionization principle (FID) shall be used to monitor the atmosphere within the enclosure. Instrument bypass flow may be returned to the enclosure. The FID shall have a response time to 90 percent of final reading of less than 1.5 seconds, and be capable of meeting performance requirements expressed as a function of C_{std}: where C_{std} is the specific enclosure hydrocarbon level, in ppm, corresponding to the evaporative emission standard:

(i) Stability of the analyzer shall be better than 0.01 C_{std} ppm at zero and span over a 15-minute period on all ranges used.

(ii) Repeatability of the analyzer, expressed as one standard deviation, shall be better than 0.005 C_{std} ppm on all ranges used.

(3) *Evaporative emission hydrocarbon data recording system.* The electrical output of the FID shall be recorded at least at the initiation and termination of each diurnal or hot soak. The recording may be by means of a strip chart potentiometric recorder, by use of an on-line computer system or other suitable means. In any case, the recording system must have operational characteristics (signal to noise ratio, speed of response, etc.)

equivalent to or better than those of the signal source being recorded, and must provide a permanent record of results. The record shall show a positive indication of the initiation and completion of each diurnal or hot soak along with the time elapsed between initiation and completion of each soak.

(4) *Tank fuel heating system.* The tank fuel heating system shall consist of a heat source and a temperature controller. A typical heat source is a 2000 W heating pad. Other sources may be used as required by circumstances. The temperature controller may be manual, such as a variable voltage transformer, or may be automated. The heating system must not cause hot spots on the tank wetted surface which could cause local overheating of the fuel. Heat must not be applied to the vapor in the tank above the liquid fuel. The temperature controller must be capable of controlling the fuel tank temperature during the diurnal soak to within ±3° F (1.7° C) of the following equation:

$$F = T_0 + 0.4t$$

or for SI units:

$$C = T_0 + (2/9)t$$

where:

F = Temperature in °F
C = Temperature in °C
t = Time since start of test in minutes
T_0 = Initial temperature

(5) *Temperature recording system.* Strip chart recorder(s) or automatic data processor shall be used to record enclosure ambient and vehicle fuel tank temperature during the evaporative emissions test. The temperature recorder or data processor shall record each temperature at least once every minute. The recording system shall be capable of resolving time to ±15s and capable of resolving temperature to ±0.75° F. (0.42° C). The temperature recording system (recorder and sensor) shall have an accuracy of ±3° F (1.7° C). The recorder (data processor) shall have a time accuracy of ±15s and a precision of ±15s. Two ambient temperature sensors, connected to provide one average output, shall be located in the enclosure. These sensors shall be located at the approximate vertical centerline of each side wall extending 4 inches (nominally) into the enclosure at a height of 3±0.5 ft (0.9±0.2 m). The vehicle fuel tank temperature sensor shall be located in the fuel tank so as to measure the temperature of the prescribed test fuel at the approximate mid-volume of the fuel. Manufacturers shall arrange that vehicles furnished for testing at Federal certification facilities be equipped with iron-constantan Type J thermocouples for measurement of fuel tank temperature.

(6) *Purge blower.* One or more portable or fixed blowers shall be used to purge the enclosure. The blowers shall have sufficient flow capacity to reduce the enclosure hydrocarbon concentration from the test level to the ambient level between tests. Actual flow capacity will depend upon the time available between tests.

(7) *Mixing blower.* One or more small blowers or fans with a total capacity of 200 to 1,000 cfm shall be used to mix the contents of the enclosure during evaporative emission testing. No portion of the air stream shall be directed towards the vehicle. Maintenance of uniform concentrations throughout the enclosure is important to the accuracy of the test.

§ 86.108-79 Dynamometer.

(a) The dynamometer shall have a power absorption unit for simulation of road load power and flywheels or other means of simulating the inertia weight as specified in § 86.129.

(b) (1) The dynamometer shall have a roll or shaft revolution counter for determination of distance driven.

(2) In lieu of the requirement in (b) (1) of this section the manufacturer shall provide some means, approved in advance by the Administrator, for the determination of distance driven.

(c) Small twin-roll dynamometers shall have a nominal roll diameter of 8.65 inches and a nominal roll spacing of 17 inches. Large single-roll dynamometers shall have a nominal roll diameter of 48 inches. Dynamometers with other roll specifications may be used if the total simulated road load power can be shown to be equivalent, and if approved in advance by the Administrator.

[42 FR 45651, Sept. 12, 1977]

§ 86.109-78 Exhaust gas sampling system.

(a)(1) *General.* The exhaust gas sampling system is designed to measure the true mass emissions of vehicle exhaust. In the CVS concept of measuring mass emissions, two conditions must be satisfied: the total volume of the mixture of exhaust and dilution air must be measured, and a continuously proportioned sample of volume must be collected for analysis. Mass emissions are determined from the sample concentration and totalized flow over the test period.

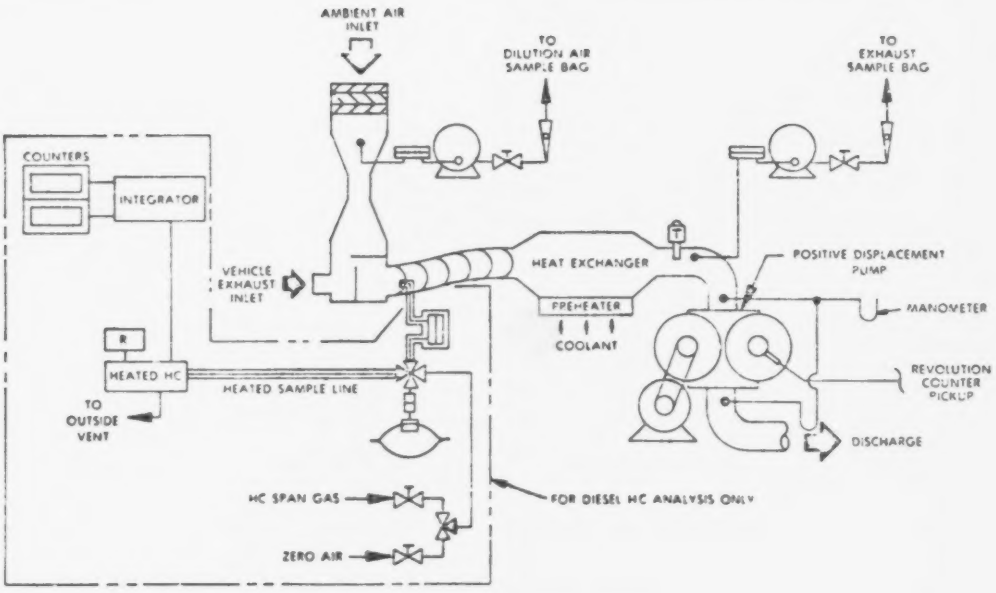
(2) *Positive Displacement Pump.* The Positive Displacement Pump-Constant Volume Sampler (PDP-CVS), Figure B78-1, satisfies the first condition by metering at a constant temperature and pressure through the pump. The total volume is measured by counting the revolutions made by the calibrated positive displacement pump. The proportional sample is achieved by sampling at a constant flow rate.

(3) *Critical Flow Venturi.* The operation of the Critical Flow Venturi-Constant Volume Sample (CFV-CVS), Figure B78-2, is based upon the principles of fluid dynamics associated with critical flow. Proportional sampling throughout temperature excursions is maintained by use of a small CFV in the sample line. The variable mixture flow rate is maintained at sonic velocity, which is directly proportional to the square root of the gas temperature, and is computed continuously. Since the pressure and temperature are the same at both venturi inlets, the sample volume is proportional to the total volume.

(4) *Diesel sampling.* Diesel vehicles require a heated flame ionization detector (HFID) for hydrocarbon analysis. The sample must be taken as close as practical to the mixing point of the dilution air and exhaust sample. The HFID, by design, draws its sample at a constant flow rate. Unless compensation for varying flow is made the HFID must be used with a constant flow system to insure a representative sample.

(5) *Other systems.* Other sampling systems may be used if shown to yield equivalent results, and if approved in advance by the Administrator (e.g., a heat exchanger with the CFV-CVS; an electronic flow integrator without a heat exchanger, with the PDP-CVS; or, for Diesel HC measurements, an electronic flow compensator with the CFV-CVS).

(b) *Component description, PDP-CVS.* The PDP-CVS, Figure B78-1, consists of a dilution air filter and mixing assembly, heat exchanger, positive displacement pump, sampling system, and associated valves, pressure and temperature sensors. The PDP-CVS shall conform to the following requirements:



(SEE FIG. B78-3 FOR SYMBOL LEGEND)
FIGURE B78-1—EXHAUST GAS SAMPLING SYSTEM (PDP-CVS)

(1) Static pressure variations at the tailpipe(s) of the vehicle shall remain within ±5 inches of water (1.2 kPa) of the static pressure variations measured during a dynamometer driving cycle with no connection to the tailpipe(s). (Sampling systems capable of maintaining the static pressure to within ±1 inch of water (0.25 kPa) will be used by the Administrator if a written request substantiates the need for this closer tolerance.)

(2) The gas mixture temperature, measured at a point immediately ahead of the positive displacement pump, shall be within ±10° F (5.6° C) of the designed operating temperature at the start of the test. The gas mixture temperature variation from its value at the start of the test shall be limited to ±10° F (5.6° C) during the entire test. The temperature measuring system shall have an accuracy and precision of ±2° F (1.1° C).

(3) The pressure gauges shall have an accuracy and precision of ±3 mm Hg (0.4 kPa).

(4) The flow capacity of the CVS shall be large enough to eliminate water condensation in the system (300 to 350 cfm, 0.140 to 0.165 m^3/s, is sufficient for most vehicles).

(5) Sample collection bags for dilution air and exhaust samples shall be of sufficient size so as not to impede sample flow.

(c) *Component description, CFV-CVS.* The CFV-CVS, Figure B78-2 consists of a dilution air filter and mixing assembly, cyclone particulate separator, sampling venturi, critical flow venturi, sampling system, and assorted valves, pressure and temperature sensors. The CFV-CVS shall conform to the following requirements:

(1) Static pressure variations at the tailpipe(s) of the vehicle shall remain within ±5 inches of water (1.2 kPa) of the static pressure variations measured during a dynamometer driving cycle with no connection to the tailpipe(s). (Sampling systems capable of maintaining the static pressure to within ±1 inch of water (0.25 kPa) will be used by the Administrator if a written request substantiates the need for this closer tolerance.)

(2) The temperature measuring system shall have an accuracy and precision of ±2° F (1.1° C) and a re-

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sponse time of 0.100 seconds to 62.5 percent of a temperature change (as measured in hot silicone oil).

(3) The pressure measuring system shall have an accuracy and precision of ±3 mm Hg (0.4 kPa).

(4) The flow capacity of the CVS shall be large enough to virtually eliminate water condensation in the system (300 to 350 cfm, 0.142 to 0.165 m^3/s, is sufficient for most vehicles).

(5) Sample collection bags for dilution air and exhaust samples shall be of sufficient size so as not to impede sample flow.

§ 86.109-82 Exhaust gas sampling system; gasoline-fueled vehicles.

(a)(1) *General.* The exhaust gas sampling system described in this paragraph is designed to measure the true mass of gaseous emissions in the exhaust of gasoline-fueled vehicles. In the CVS concept of measuring mass emissions, two conditions must be satisfied: the total volume of the mixture of exhaust and dilution air must be measured, and a continuously proportioned sample of volume must be collected for analysis. Mass emissions are determined from the sample concentration and total flow over the test period.

(2) *Positive displacement pump.* The positive displacement pump-constant volume sampler (PDP-CVS), Figure B82-1, satisfies the first condition by metering at a constant temperature and pressure through the pump. The total volume is measured by counting the revolutions made by the calibrated positive displacement pump. The proportional sample is achieved by sampling at a constant flow rate.

(3) *Critical flow venturi.* The operation of the critical flow venturi (CFV) sample system, Figure B82-2, is based upon the principles of fluid dynamics associated with critical flow. Proportional sampling throughout temperature excursions is maintained by use of a small CFV in the sample line. The variable mixture flow rate is maintained at sonic velocity, is inversely proportional to the square root of the gas temperature, and is computed continuously. Since the pressure and temperature are the same at both venturi inlets, the sample volume is proportional to the total volume.

(4) *Other systems.* Other sampling systems may be used if shown to yield equivalent results, and if approved in advance by the Administrator.

(b) *Component description, PDP-CVS.* The PDP-CVS, Figure B82-1, consists of a dilution air filter and mixing assembly, heat exchanger, positive displacement pump, sampling system, and associated valves, pressure and temperature sensors. The PDP-CVS shall conform to the following requirements:

(1) Static pressure variations at the tailpipe(s) of the vehicle shall remain within ±5 inches of water (1.2 kPa) of the static pressure variations measured during a dynamometer driving cycle with no connection to the tailpipe(s). (Sampling systems capable of maintaining the static pressure to within ±1 inch of water (0.25 kPa) will be used by the Administrator if a written request substantiates the need for this closer tolerance.)

(2) The gas mixture temperature, measured at a point immediately ahead of the positive displacement pump, shall be within ±10° F (6° C) of the designed operating temperature at the start of the test. The gas mixture temperature variation from its value at the start of the test shall be limited to ±10° F (6° C) during the entire test. The temperature measuring system shall have an accuracy and precision of ±2° F (1.1° C).

(3) The pressure gauges shall have an accuracy and precision of ±1.6 inches of water (0.4 kPa).

(4) The flow capacity of the CVS shall be large enough to virtually eliminate water condensation in the system. (300 to 350 cfm (0.142 to 0.165 m^3/s) is sufficient for most vehicles.)

(5) Sample collection bags for dilution air and exhaust samples shall be sufficient size so as not to impede sample flow.

(c) *Component description, CFV.* The CFV sample system, Figure B82-2, consists of a dilution air filter and mixing assembly, a cyclone particulate separator, a sampling venturi, a critical flow venturi, a sampling system and assorted valves, and pressure and temperature sensors. The CFV sample

system shall conform to the following requirements:

(1) Static pressure variations at the tailpipe(s) of the vehicle shall remain within ±5 inches of water (1.2 kPa) of the static pressure variations measured during a dynamometer driving cycle with no connection to the tailpipe(s). (Sampling systems capable of maintaining the static pressure to within ±1 inch of water (0.25 kPa) will be used by the Administrator if a written request substantiates the need for this closer tolerance.)

(2) The temperature measuring system shall have an accuracy and precision of ±2° F (1.1° C) and a response time of 0.100 seconds of 62.5 percent of a temperature change (as measured in hot silicone oil).

(3) The pressure measuring system shall have an accuracy and precision of ±1.6 inches of water (0.4 kPa).

(4) The flow capacity of the CVS shall be large enough to virtually eliminate water condensation in the system. (300 to 350 cfm (0.142 to 0.165 m^3/s) is sufficient for most vehicles.)

(5) Sample collection bags for dilution air and exhaust samples shall be of sufficient size so as not to impede sample flow.

[45 FR 14509, Mar. 5, 1980]

§ 86.110-78 [Reserved]

§ 86.110-82 Exhaust gas sampling system; diesel vehicles.

(a) *General.* The exhaust gas sampling system described in this paragraph is designed to measure the true mass of both gaseous and particulate emissions in the exhaust of light-duty Diesel vehicles. This system utilizes the CVS concept (described in § 86.109) of measuring mass emissions. The mass of gaseous emissions is determined from the sample concentration and total flow over the test period. The mass of particulate emissions is determined from a proportional mass sample collected on a filter and from the total flow over the test period. General requirements are as follows:

(1) This sampling system requires the use of a PDP-CVS or CFV sample system with heat exchanger connected to a dilution tunnel. Figure B82-3 is a schematic drawing of the PDP system. Figure B82-4 is a schematic drawing of the CFV system.

(2) Diesel vehicles require a heated flame ionization detector (HFID) sample for hydrocarbon analysis. The HFID sample must be taken directly from the diluted exhaust stream through a heated probe in the dilution tunnel.

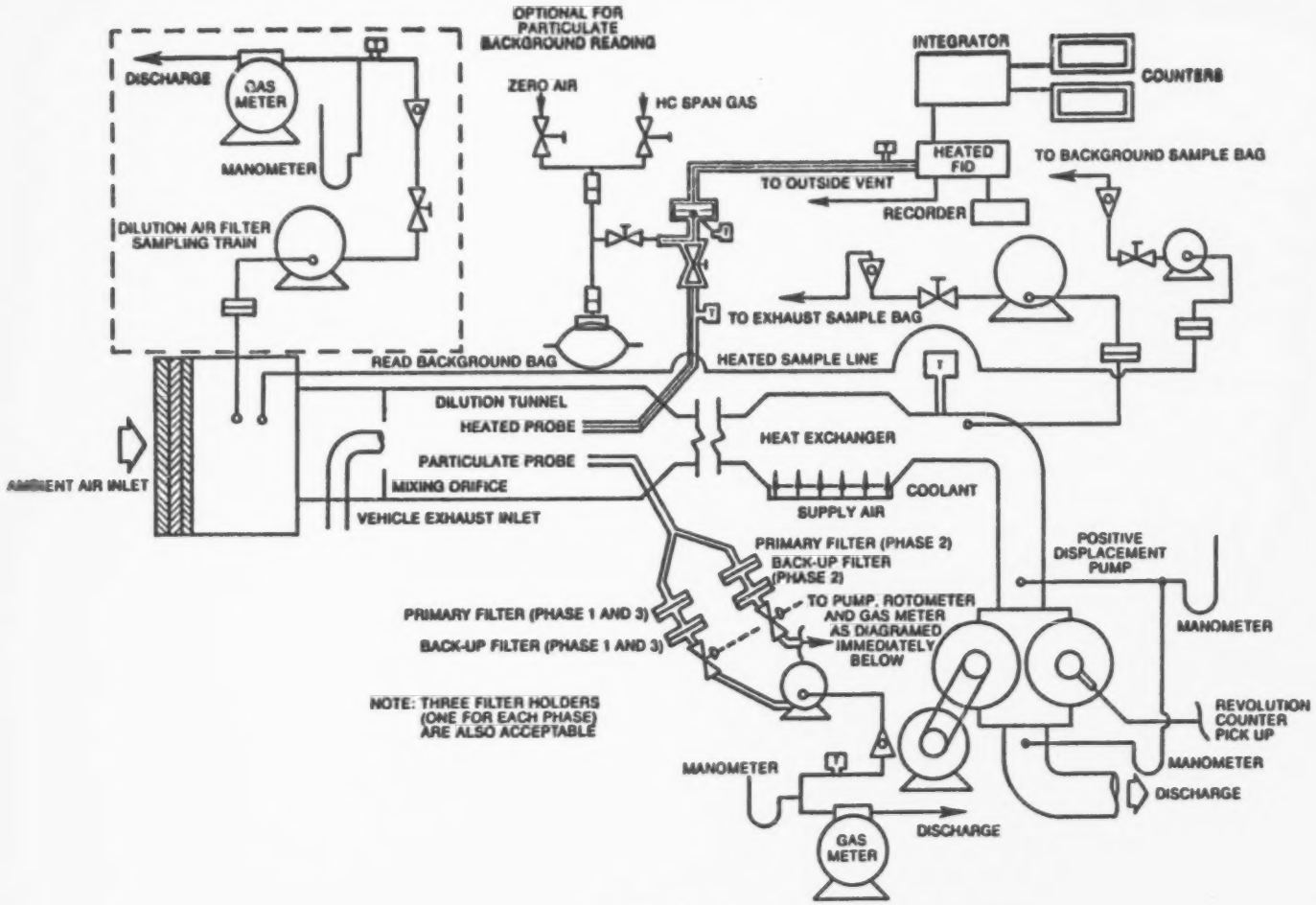

FIGURE B82-3
GASEOUS AND PARTICULATE EMISSIONS SAMPLING SYSTEM (PDP-CVS)
(FOR DIESEL VEHICLES ONLY)

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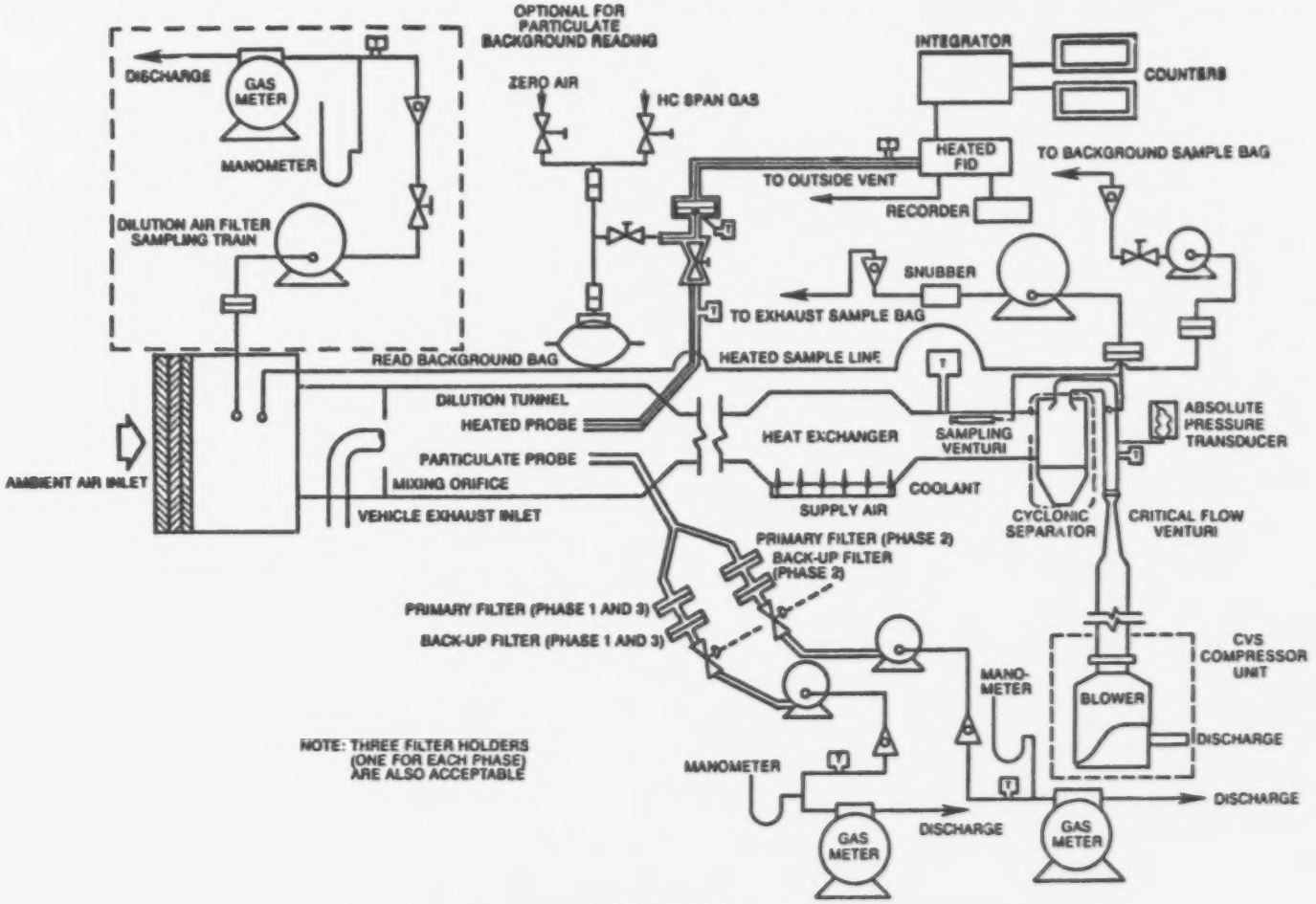

FIGURE B82-4
GASEOUS AND PARTICULATE EMISSIONS SAMPLING SYSTEM (CFV-CVS)
(FOR DIESEL VEHICLES ONLY)

(3) Bag, HFID and particulate sampling capabilities as shown in Figure B82-3 (or Figure B82-4) are required to provide both gaseous and particulate emissions sampling capabilities from a single system.

(4) Since various configurations can produce equivalent results, exact conformance with these drawings is not required. Additional components such as instruments, valves, solenoids, pumps, and switches may be used to provide additional information and coordinate the functions of the component systems.

(5) Other sampling systems may be used if shown to yield equivalent results and if approved in advance by the Administrator.

(b) *Component description.* The components necessary for Diesel exhaust sampling shall meet the following requirements:

(1) The PDP-CVS, Figure B82-3, shall conform to all of the requirements listed for the exhaust gas PDP-CVS (§ 86.109(b)), with one exception: A flow rate of sufficient volume is required to maintain the diluted exhaust stream, from which the particulate sample flow is taken, at a temperature of 125°F (52°C) or less.

(2) The CFV sample system, Figure B82-4, shall conform to all of the requirements listed for the exhaust gas CFV sample system (§ 86.109(c)), with four exceptions:

(i) A flow rate of sufficient volume is required to maintain the diluted exhaust stream, from which the particulate sample flow is taken, at a temperature of 125°F (52°C) or less.

(ii) A heat exchanger is required.

(iii) The gas mixture temperature, measured at a point immediately ahead of the critical flow venturi, shall be within ±20°F (11°C) of the designed operating temperature at the start of the test. The gas mixture temperature variation from its value at the start of the test shall be limited to ±20°F (11°C) during the entire test. The temperature measuring system shall have an accuracy and precision of ±2°F (1.1°C).

(iv) The cyclonic separator is optional.

(3) The transfer of heat from the vehicle exhaust gas shall be minimized between the point where it leaves the vehicle tailpipe(s) and the point where it enters the dilution tunnel airstream. To accomplish this, a short length (not more than 12 feet (365 cm) if uninsulated, or not more than 20 feet (610 cm) if insulated) of smooth stainless steel tubing from the tailpipe to the dilution tunnel is required. This tubing shall have a maximum inside diameter of 4.0 inches (10.2 cm). Short sections of flexible tubing at connection points are allowed.

(4) The vehicle exhaust shall be directed downstream at the point where it is introduced into the dilution tunnel.

(5) The dilute air shall be between 68°F (20°C) and 86°F (30°C) during the test.

(6) The dilution tunnel shall be:

(i) Sized to permit development of turbulent flow (Reynold's No. >>4000) and complete mixing of the exhaust and dilution air between the mixing orifice and each of the two sample probes (i.e., the particulate probe and the heated HC sample probe). It is recommended that uniform mixing be demonstrated by the user.

(ii) At least 8.0 inches (20.3 cm) in diameter.

(iii) Constructed of electrically conductive material which does not react with the exhaust components.

(iv) Grounded.

(7) The temperature of the diluted exhaust stream inside of the dilution tunnel shall be sufficient to prevent water condensation. However, the sample zone dilute exhaust temperature shall not exceed 125° F (52° C) at any time during the test.

(8) The particulate sample probe shall be:

(i) Installed facing upstream at a point where the dilution air and exhaust are well mixed (i.e., near the tunnel centerline, approximately 10 tunnel diameters downstream from the point where the exhaust enters the dilution tunnel).

(ii) Sufficiently distant (radially) from the total hydrocarbon probe so as to be free from the influence of any wakes or eddies produced by the total hydrocarbon probe.

(iii) 0.5 inch (1.27 cm) minimum inside diameter.

(iv) The distance from the sampling tip to the filter holder shall be at least 5 probe diameters (for filters located inside of the tunnel), but not more than 40.0 inches (102 cm) for filters located outside of the dilution tunnel.

(v) Free from sharp bends.

(vi) Configured so that a clean particulate filter (including back-up filter) can be selected simultaneously with the selection of an empty gaseous emissions bag.

(9) The flow rate through the particulate probe shall be maintained to a constant value within ±5 percent of the set flow rate.

(10) The particulate sample pump shall be located sufficiently distant from the dilution tunnel so that the inlet gas temperature is maintained at a constant temperature (±5.0° F (2.8° C)).

(11) The gas meters or flow instrumentation shall be located sufficiently distant from the tunnel so that the inlet gas temperature remains constant (±5.0° F (2.8° C)).

(12) The total hydrocarbon probe shall be:

(i) Installed facing upstream at a point where the dilution air and exhaust are well mixed (i.e., approximately 10 tunnel diameters downstream from the point where the exhaust enters the dilution tunnel).

(ii) Sufficiently distant (radially) from the particulate probe so as to be free from the influence of any wakes or eddies produced by the particulate probe.

(iii) Heated and insulated over the entire length to maintain a 375°±20° F (191°±11° C) *wall* temperature.

(iv) 0.19 in. (0.457 cm) minimum inside diameter.

(13) It is intended that the total hydrocarbon probe be free from cold spots (i.e., free from spots where the probe *wall* temperature is less than 355° F). This will be determined by a temperature sensor located on a section of the probe wall outside of the dilution tunnel. The temperature sensor shall be insulated from any heating elements on the probe. The sensor shall have an accuracy and precision of ±2° F (1.1° C).

(14) The *dilute exhaust gas* flowing in the total hydrocarbon sample system shall be:

(i) At 375° ±10° F (191° ±6° C) immediately before the heated filter. This will be determined by a temperature sensor located immediately upstream of the filter. The sensor shall have an accuracy and precision of ±2° F (1.1° C).

(ii) At 375° F ±10° F (191° ±6° C) immediately before the HFID. This will be determined by a temperature sensor located at the exit of the heated sample line. The sensor shall have an accuracy and precision of ±2° F (1.1° C).

(15) It is intended that the *dilute exhaust gas* flowing in the total hydrocarbon sample system be between 365°F and 385°F (185°C and 197°C).

(c) *Filters, particulate sampling*—(1) *Filter acceptance criteria.* Valid diesel particulate net filter weights shall be accepted according to the following criteria:

(i) During each phase of the UDDS, dilute exhaust will be simultaneously sampled by paired primary test and back-up test filters.

(ii) The back-up filter holder shall be located 3 to 4 inches downstream of the primary filter holder.

(iii) The net weight of particulate material collected on each primary test filter and each back-up test filter shall be determined by the procedure outlined in § 86.139.

(iv) A ratio of net weights will be determined by the following formula:

$$\text{Ratio of net weights} = \frac{(\text{Mass particulate})_{\text{primary filter}}}{(\text{Mass particulate})_{\text{primary filter}} + (\text{Mass particulate})_{\text{back up filter}}}$$

(v) If the ratio is greater than 0.95, then particulate emissions calculations are based on the net weight of the primary filter only.

(vi) If the ratio is less than 0.95, then particulate emissions calculations are based on the combined net weights of the back-up test filter and the primary test filter.

(2) The particulate filter must have a minimum 47 mm diameter (37 mm stain area). Larger diameter filters are also acceptable. (Larger diameter filters may be desirable in order to reduce the pressure drop across the filter when testing vehicles which produce large amounts of particulate.)

(3) The recommended minimum loading on the 47 mm filter is 2 milligrams. Equivalent loadings (i.e., mass/stain area) are recommended for larger filters.

(4) Fluorocarbon coated glass fiber filters or fluorocarbon based (membrane) filters are required for particulate collection.

[45 FR 14509, Mar. 5, 1980, as amended at 46 FR 50493, Oct. 13, 1981]

§ 86.111-78 Exhaust gas analytical system.

(a) *Schematic drawings.* Figure B78-3 is a schematic drawing of the exhaust gas analytical system. The schematic of the hydrocarbon analysis train for diesel vehicles is shown as part of Figure B78-1. Since various configurations can produce accurate results, exact conformance with either drawing is not required. Additional components such as instruments, valves, solenoids, pumps and switches may be used to provide additional information and coordinate the functions of the component systems.

(b) *Major component description.* The analytical system, Figure B78-3, consists of a flame ionization detector (FID) for the determination of hydrocarbons, nondispersive infrared analyzers (NDIR) for the determination of carbon monoxide and carbon dioxide and a chemiluminescence analyzer (CL) for the determination of oxides of nitrogen. A heated flame ionization detector (HFID) is used for the continuous determination of hydrocarbons from diesel fueled vehicles, Figure B78-1. The exhaust gas analytical system shall conform to the following requirements:

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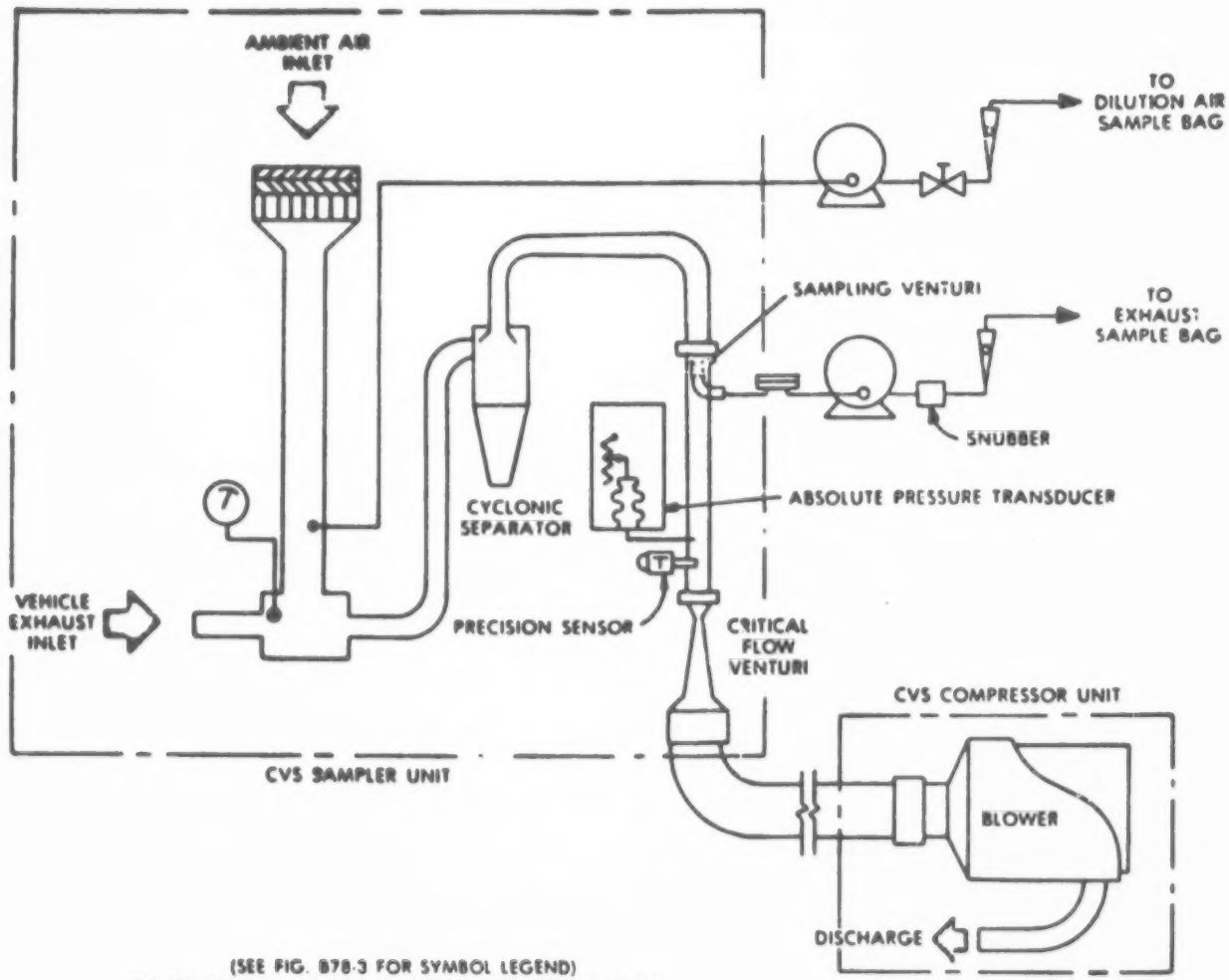

(SEE FIG. B78-3 FOR SYMBOL LEGEND)

FIGURE B78-2—EXHAUST GAS SAMPLING SYSTEM (CFV-CVS)

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(1) The CL requires that the nitrogen dioxide present in the sample be converted to nitric oxide before analysis. Other types of analyzers may be used if shown to yield equivalent results and if approved in advance by the Administrator.

(2) The carbon monoxide (NDIR) analyzer may require a sample conditioning column containing $CaSO_4$ or indicating silica gel to remove water vapor and containing ascarite to remove carbon dioxide from the CO analysis stream.

(i) If CO instruments which are essentially free of CO_2 and water vapor interference are used, the use of the conditioning column may be deleted, see §§ 86.122 and 86.144.

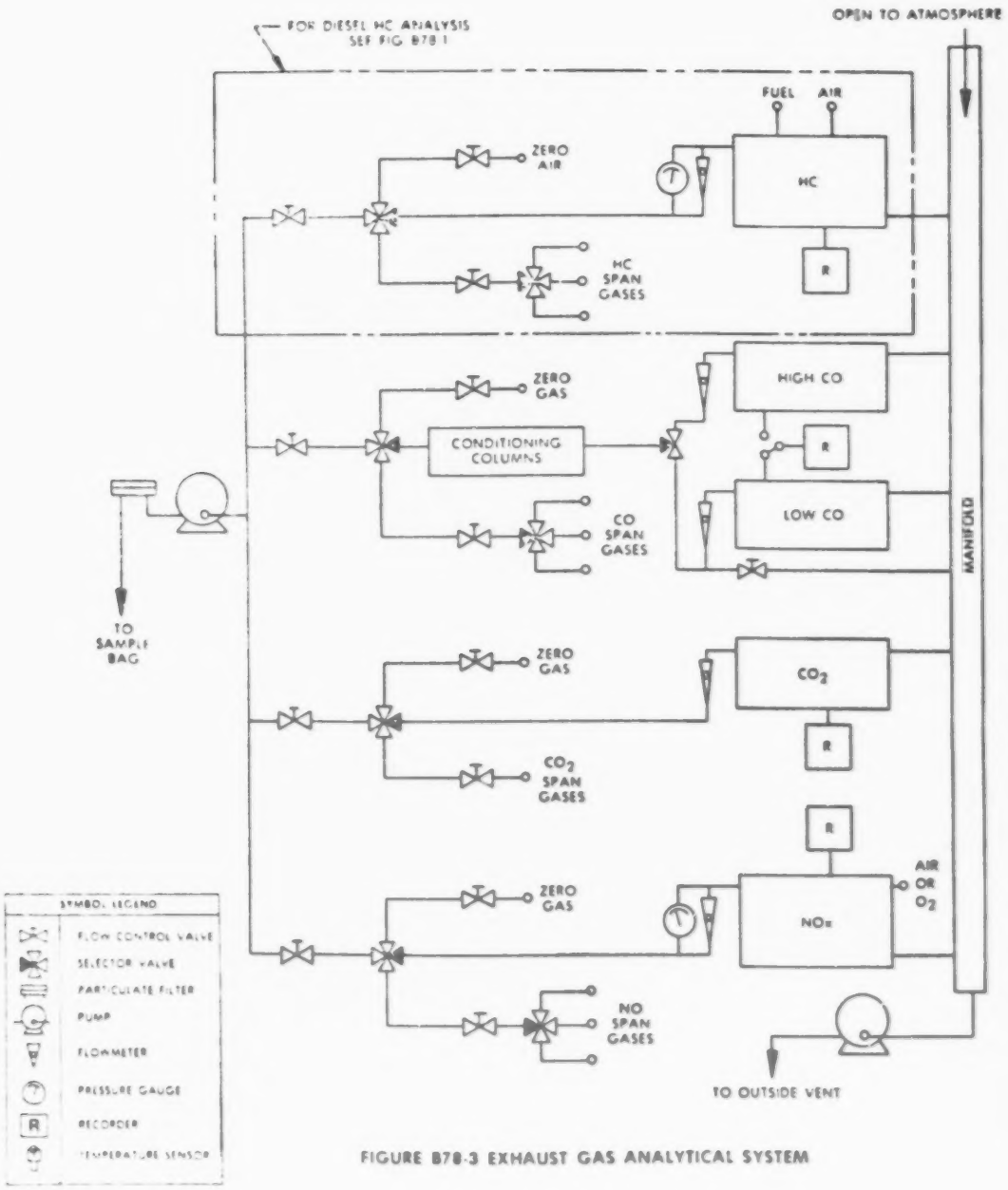

FIGURE B78-3 EXHAUST GAS ANALYTICAL SYSTEM

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(ii) A CO instrument will be considered to be essentially free of CO_2 and water vapor interference if its response to a mixture of 3 percent CO_2 in N_2 which has been bubbled through water at room temperature produces an equivalent CO response, as measured on the most sensitive CO range, which is less than 1 percent of full scale CO concentration on ranges above 300 ppm full scale or less than 3 ppm on ranges below 300 ppm full scale, see § 86.122.

(3) For diesel vehicles a continuous sample shall be measured using a heated analyzer train as shown in Figure B78-1. The train shall include a heated continuous sampling line, a heated particulate filter, and a heated hydrocarbon instrument (HFID) complete with heated pump, filter and flow control system.

(i) The response time of this instrument shall be less than 1.5 seconds for 90 percent of full-scale response.

(ii) Sample transport time from sampling point to inlet of instrument shall be less than 4 seconds.

(iii) The sample line and filter shall be heated to a set point ±10 F (±5.6 C) between 300 and 390 F (149 and 199 C).

(c) *Other analyzers and equipment.* Other types of analyzers and equipment may be used if shown to yield equivalent results and if approved in advance by the Administrator.

§ 86.111-82 Exhaust gas analytical system.

(a) *Schematic drawings.* Figure B82-5 is a schematic drawing of the exhaust gas analytical system. The schematic diagram of the hydroocarbon analysis train for diesel vehicles is shown as part of Figure B82-3 (or Figure B82-4). Since various configurations can produce accurate results, exact conformance with either drawing is not required. Additional components such as instruments, valves, solenoids, pumps and switches may be used to provide additional information and coordinate the functions of the component systems.

(b) *Major component description.* The analytical system, Figure B82-5, consists of a flame ionization detector (FID) for the determination of hydrocarbons, nondispersive infrared analyzers (NDIR) for the determination of carbon monoxide and carbon dioxide and a chemiluminescence analyzer (CL) for the determination of oxides of nitrogen. A heated flame ionization detector (HFID) is used for the continuous determination of hydrocarbons from diesel-fueled vehicles, Figure B82-3 (or B82-4). The exhaust gas analytical system shall conform to the following requirements:

(1) The CL requires that the nitrogen dioxide present in the sample be converted to nitric oxide before analysis. Other types of analyzers may be used if shown to yield equivalent results and if approved in advance by the Administrator.

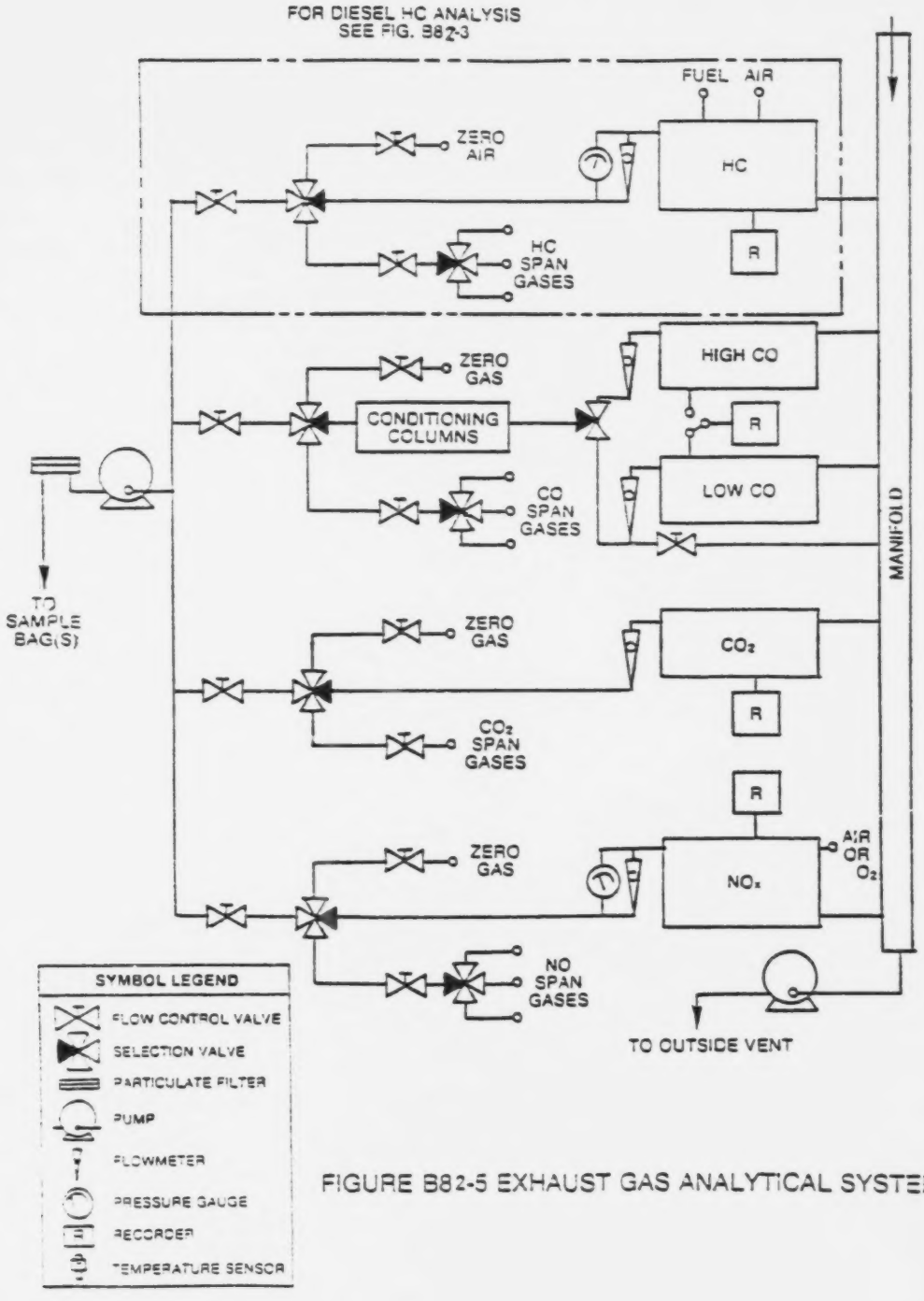

FIGURE B82-5 EXHAUST GAS ANALYTICAL SYSTEM

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(2) The carbon monoxide (NDIR) analyzer may require a sample conditioning column containing $CaSO_4$, or indicating silica gel to remove water vapor and containing ascarite to remove carbon dioxide from the CO analysis stream.

(i) If CO instruments which are essentially free of CO_2 and water vapor interference are used, the use of the conditioning column may be deleted, see §§ 86.122 and 86.144.

(ii) A CO instrument will be considered to be essentially free of CO_2 and water vapor interference if its response to a mixture of 3 percent CO_2 in N_2 which has been bubbled through water at room temperature produces an equivalent CO response, as measured on the most sensitive CO range, which is less than 1 percent of full scale CO concentration on ranges above 300 ppm full scale or less than 3 ppm on ranges below 300 ppm full scale, see § 86.122.

(3) For diesel vehicles a continuous hydrocarbon sample shall be measured using a heated analyzer train as shown in Figure B82-3 (or B82-4). The train shall include a heated probe, a heated continuous sampling line, a heated particulate filter and a heated hydrocarbon instrument (HFID) complete with heated pump, filter and flow control system.

(i) The response time of this instrument shall be less than 1.5 seconds for 90 percent of full scale response.

(ii) Sample transport time from sampling point to inlet of instrument shall be less than 4 seconds.

(iii) The sample line and filter shall be heated to maintain a sample gas temperature of 375° ± 10° F (191 ± 6° C) before the filter and before the HFID.

(c) *Other analyzers and equipment.* Other types of analyzers and equipment may be used if shown to yield equivalent results and if approved in advance by the Administrator.

[45 FR 14513, Mar. 5, 1980]

§ 86.112–78 [Reserved]

§ 86.112–82 Weighing chamber (or room) and microgram balance specifications.

(a) *Ambient conditions*—(1) *Temperature.* The temperature of the chamber in which the particulate filters are conditioned and weighed shall be maintained to within ± 10 F (6 C) of a set point between 68 F (20 C) and 86 F (30 C) during all filter conditioning and filter weighing. A continuous recording of the temperature is required.

(2) *Humidity.* The relative humidity of the chamber in which the particulate filters are conditioned and weighed shall be maintained to within ± 10 percent of a set point between 30 and 70 percent during all filter conditioning and filter weighing. A continuous recording of the temperature is required.

(3) The environment shall be free from any ambient contamints (such as dust) that would settle on the particulate filters during their stabilization. It is required that two reference filters remain in the weighing room at all times, and that these filters be weighed once each 24-hour period. If the weight of either or both of these two reference filters changes by more than ± 1.0 percent of the nominal filter loading (minimum 2 milligrams) during the 24-hour period, then all filter weighings taken during the 24-hour period are invalid. Filters in the process of being stabilized during this period should be discarded. The reference filters shall be changed at least once per month.

(b) *Microgram balance specifications.* The microgram balance used to determine the weights of all filters shall have a precision (standard deviation) and a readability of one microgram.

[45 FR 14515, Mar. 5, 1980]

§ 86.113–82 Fuel specifications.

(a) *Gasoline.* (1) Gasoline having the following specifications will be used by the Administrator in exhaust and evaporative emission testing. Gasoline having the following specification or substantially equivalent specifications approved by the Administrator, shall be used by the manufacturer in exhaust and evaporative testing except that the lead and octane specifications do not apply.

Item	ASTM	Leaded	Unleaded
Octane, (research), minimum	D2699	98	93
Sensitivity, minimum		7.5	7.5
Lead (organic), grams/U.S. gallon		[1]1.4	0.00-.05
Distillation Range:			
IBP, °F	D86	75-95	75-95
10 pct point, °F	D86	120-135	120-135
50 pct point, °F	D86	200-230	200-230
90 pct point, °F	D86	300-325	300-325
E.P., °F (maximum)	D86	415	415
Sulfur, weight percent, maximum	D1266	0.10	0.10
Phosphorus, grams/U.S. gallon, maximum		0.01	0.005
RVP, [2] pounds per square inch	D323	8.7-9.2	8.7-9.2
Hydrocarbon composition:			
Olefins, percent, maximum	D1319	10	10
Aromatics, percent maximum	D1319	35	35
Saturates	D1319	([3])	([3])

[1] Minimum.
[2] For testing at altitudes above 1,219 m (4,000 ft) the specified range is 7.5-10.5.
[3] For testing which is unrelated to evaporative emission control, the specified range is 8.0-9.2.
[4] For testing at altitudes above 1,219 m (4,000 ft) the specified range is 7.9-9.2.
[5] Remainder.

(2) Gascline representative of commercial gasoline which will be generally available through retail outlets shall be used in service accumulation. For leaded fuel the minimum lead content shall be equal to the average lead content found in regular leaded gasoline in the fuel survey prescribed by the Administrator. Where the Administrator determines that vehicles represented by a test vehicle will be operated using gasoline of different lead content than that prescribed in this paragraph, he may consent in writing to use a gasoline with a different lead content. The octane rating of the gasoline used shall be no higher than 1.0 research octane number above the minimum recommended by the manufacturer and have a minimum sensitivity of 7.5 octane numbers for unleaded fuel and 7.0 octane numbers for leaded fuel, where sensitivity is defined as the Research octane number minus the Motor octane number. The Reid Vapor Pressure of the gasoline used shall be characteristic of the motor fuel used during the season in which the service accumulation takes place.

(3) The specification range of the gasoline to be used under paragraph (a)(2) of this section shall be reported in accordance with § 86.079-21(b)(3).

(b) *Diesel fuel.* (1) The diesel fuels employed for testing shall be clean and bright, with pour and cloud points adequate for operability. The diesel fuel may contain nonmetallic additives as follows: Cetane improver, metal deactivator, antioxidant, dehazer, antirust, pour depressant, dye, and dispersant.

(2) Diesel fuel meeting the following specifications, or substantially equivalent specifications approved by the Administrator, shall be used in exhaust emission testing. The grade of diesel fuel recommended by the engine manufacturer, commercially designated as "Type 2D" grade diesel, shall be used.

Item	ASTM test method No.	Type 2-D
Cetane Number	D613, D86	42-50
Distillation range:		
IBP, °F		340-400
10 percent point, °F		400-460
50 percent point, °F		470-540
90 percent point, °F		550-610
EP, °F		580-660
Gravity, API	D287	33-37
Total sulfur, percent	D129 or D2622	0.2-0.5
Hydrocarbon composition	D1319	
Aromatics, percent (minimum)		27
Paraffins, naphthenes, olefins		([1])
Flashpoint, °F (minimum)	D93	130
Viscosity, centistokes	D445	2.0-3.2

[1] Remainder.

(3) Diesel fuel meeting the following specifications, or substantially equivalent specifications approved by the Administrator, shall be used in service accumulation. The grade of diesel fuel recommended by the engine manufacturer, commercially, designated as "Type 2-D" grade diesel fuel, shall be used.

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Item	ASTM test method No	Type 2-D
Cetane Number	D613	38-58
Distillation range:		
90 percent point, F	D86	430-630
Gravity, API	D287	30-42
Total sulfur, percent (minimum)	D129 or D2622	0.2
Flashpoint, F (minimum)	D93	130
Viscosity, centistokes	D455	1.5-4.5

(4) Other petroleum distillate fuel specifications:

(i) Other petroleum distillate fuels may be used for testing and service accumulation provided they are commercially available, and

(ii) Information, acceptable to the Administrator, is provided to show that only the designated fuel would be used in customer service, and

(iii) Use of a fuel listed under paragraph (b)(2) and (b)(3) of this section would have a detrimental effect on emissions or durability, and

(iv) Written approval from the Administrator of the fuel specifications must be provided prior to the start of testing.

(5) The specification range of the fuels to be used under paragraphs (b)(2), (b)(3), and (b)(4) of this section shall be reported in accordance with §86.078-21(b)(3).

(c) Fuels not meeting the specifications set forth in this section may be used only with the advance approval of the Administrator.

[46 FR 50493, Oct. 13, 1981]

§ 86.114-79 Analytical gases.

(a) Analyzer gases.

(1) Gases for the CO and CO_2 analyzers shall be single blends of CO and CO_2 respectively using nitrogen as the diluent.

(2) Gases for the hydrocarbon analyzer shall be single blends of propane using air as the diluent.

(3) Gases for NO_x analyzer shall be single blends of NO named as NO_x, with a maximum NO_2 concentration of 5 percent of the nominal value, using nitrogen as the diluent.

(4) Fuel for the evaporative emission enclosure FID shall be a blend of 40±2% hydrogen with the balance being helium. The mixture shall contain less than 1 ppm equivalent carbon response. 98 to 100 percent hydrogen fuel may be used with advance approval by the Administrator.

(5) The allowable zero gas (air or nitrogen) impurity concentrations shall not exceed 1 ppm equivalent carbon response, 1 ppm carbon monoxide, 0.04 percent (400 ppm) carbon dioxide and 0.1 ppm nitric oxide.

(6) "Zero grade air" includes artificial "air" consisting of a blend of nitrogen and oxygen with oxygen concentrations between 18 and 21 mole percent.

(7) The use of proportioning and precision blending devices to obtain the required analyzer gas concentration is allowable provided their use has been approved in advance by the Administrator.

(b) Calibration gases shall be traceable to within 1 percent of NBS gas standards, or other gas standards which have been approved by the Administrator.

(c) Span gases shall be accurate to within 2 percent of true concentration, where true concentration refers to NBS gas standards, or other gas standards which have been approved by the Administrator.

[42 FR 32954, June 28, 1977, as amended at 43 FR 52920, Nov. 14, 1978]

§ 86.115-78 EPA urban dynamometer driving schedule.

(a) The dynamometer driving schedule is listed in Appendix I. The driving schedule is defined by a smooth trace drawn through the specified speed vs. time relationships. It consists of a nonrepetitive series of idle, acceleration, cruise, and deceleration modes of various time sequences and rates.

(b)(1) The dynamometer driving schedule is prescribed in appendix I. The speed tolerance at any given time for this schedule, or for a driver's aid chart approved by the Administrator, when conducted to meet the provisions of § 86.137 are:

(i) The upper limit is 2 mph (3.2 km/h) higher than the highest point on the trace within 1 second of the given time.

(ii) The lower limit is 2 mph (3.2 km/h) lower than the lowest point on

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the trace within 1 second of the given time.

(iii) Speed variations greater than the tolerances (such as may occur during gear changes) are acceptable provided they occur for less than 2 seconds on any occasion.

(iv) Speeds lower than those prescribed are acceptable provided the vehicle is operated at maximum available power during such occurrences.

(v) When conducted to meet the requirements of § 86.132, the speed tolerance shall be as specified above, except the upper and lower limits shall be 4 mph (6.4 km/h).

(c) Figures B78-4(a) and B78-4(b) show the range of acceptable speed tolerances for typical points. Figure B78-4(a) is typical of portions of the speed curve which are increasing or decreasing throughout the 2-second time interval. Figure B78-4(b) is typical of portions of the speed curve which include a maximum or minimum value.

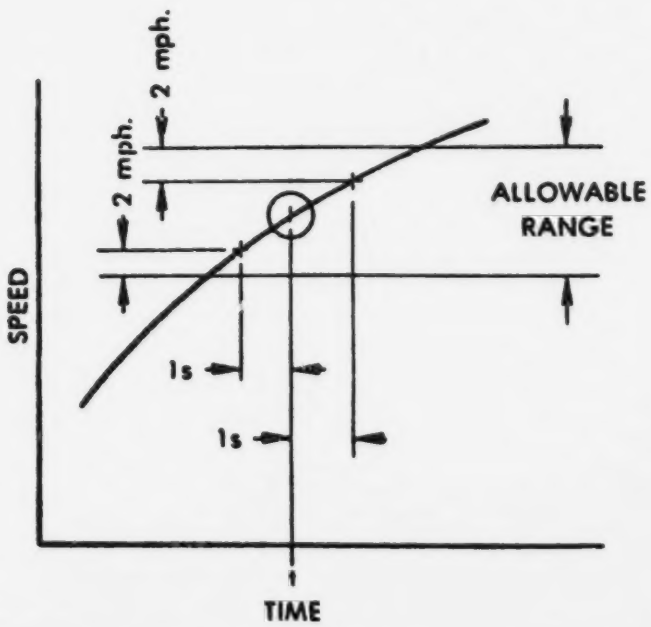

FIGURE B78-4a—DRIVERS TRACE, ALLOWABLE RANGE

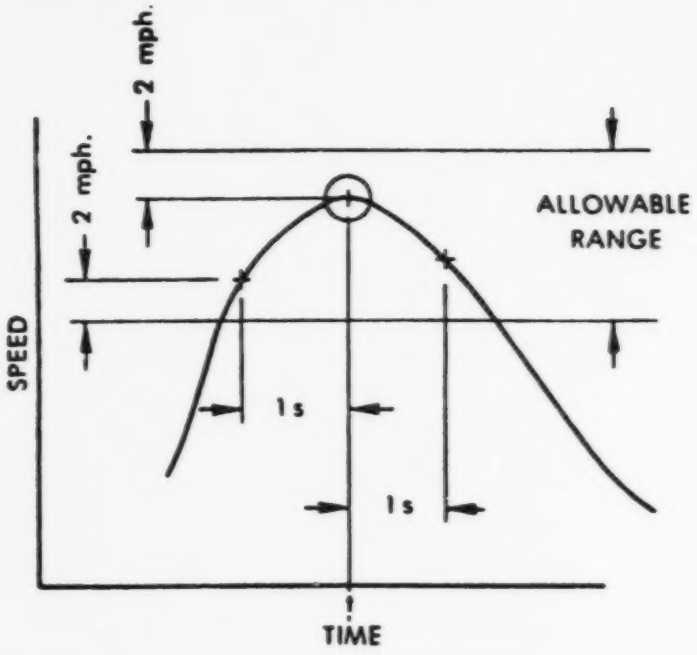

FIGURE B78-4b—DRIVERS TRACE, ALLOWABLE RANGE

[42 FR 32954, June 28, 1977, as amended at 43 FR 52920, Nov. 14, 1978]

§ 86.116-78 Calibrations; frequency and overview.

(a) Calibrations shall be performed as specified in §§ 86.117 through 86.126.

(b) At least yearly or after any maintenance which could alter background emission levels, enclosure background emission measurements shall be performed.

(c) At least monthly or after any maintenance which could alter calibration, the following calibrations and checks shall be performed:

(1) Calibrate the hydrocarbon analyzers (both evaporative and exhaust instruments), carbon dioxide analyzer, carbon monoxide analyzer, and oxides of nitrogen analyzer.

(2) Calibrate the dynamometer. If the dynamometer receives a weekly performance check (and remains within calibration) the monthly calibration need not be performed.

(3) Perform a hydrocarbon retention check and calibration on the evaporative emission enclosure.

(d) At least weekly or after any maintenance which could alter calibration, the following calibrations and checks shall be performed:

(1) Check the oxides of nitrogen converter efficiency, and

(2) Perform a CVS system verification, and

(3) Run a performance check on the dynamometer. This check may be omitted if the dynamometer has been calibrated within the preceding month.

(e) The CVS positive displacement pump or Critical Flow Venturi shall be calibrated following initial installation, major maintenance or as necessary when indicated by the CVS system verification (described in § 86.119).

(f) Sample conditioning columns, if used in the CO analyzer train, should be checked at a frequency consistent with observed column life or when the indicator of the column packing begins to show deterioration.

§ 86.116-82 Calibrations, frequency and overview.

(a) Calibrations shall be performed as specified in §§ 86.117 through 86.126.

(b) At least yearly or after any maintenance which could alter background emission levels, evaporative enclosure background emission measurements shall be performed.

(c) At least monthly or after any maintenance which could alter calibration, the following calibrations and checks shall be performed:

(1) Calibrate the hydrocarbon analyzers (both evaporative and exhaust instruments), carbon dioxide analyzer, carbon monoxide analyzer, and oxides of nitrogen analyzer.

(2) Calibrate the dynamometer. If the dynamometer receives a weekly performance check (and remains within calibration) the monthly calibration need not be performed.

(3) Perform a hydrocarbon retention check and calibration on the evaporative emission enclosure.

(4) Calibrate the gas meters or flow instrumentation used for providing total flow measurement for particulate sampling.

(d) At least weekly or after any maintenance which could alter calibration, the following calibrations and checks shall be performed:

(1) Check the oxides of nitrogen converter efficiency, and

(2) Perform a CVS system verification.

(3) Run a performance check on the dynamometer. This check may be omitted if the dynamometer has been calibrated within the preceding month.

(e) The CVS positive displacement pump or Critical Flow Venturi shall be calibrated following initial installation, major maintenance or as necessary when indicated by the CVS system verification (described in § 86.119).

(f) Sample conditioning columns, if used in the CO analyzer train, should be checked at a frequency consistent with observed column life or when the indicator of the column packing begins to show deterioration.

[45 FR 14515, Mar. 5, 1980]

§ 86.117-78 Evaporative emission enclosure calibrations.

The calibration of the evaporative emission enclosure consists of three parts: Initial and periodic determination of enclosure background emissions; initial determination of enclosure internal volume; and periodic hydrocarbon retention check and calibration.

(a) *Initial and periodic determination of enclosure background emissions.* Prior to its introduction into service, annually thereafter, and after any repair which can affect the enclosure background emissions, the enclosure shall be checked to determine that it does not contain materials which will themselves emit hydrocarbons. Proceed as follows:

(1) Zero and span (calibrate if required) the hydrocarbon analyzer.

(2) Purge the enclosure until a stable background hydrocarbon reading is obtained.

(3) Turn on the mixing blower (if not already on).

(4) Seal enclosure and measure background hydrocarbon concentration, temperature, and barometric pressure. These are the initial readings C_{HCi}, T_i and P_{Bi} for the enclosure background determination.

(5) Allow the enclosure to stand undisturbed without sampling for four hours.

(6) Measure the hydrocarbon concentration on the same FID. This is the final concentration, C_{HCf}. Also measure final temperature and barometric pressure.

(7) Calculate the mass change of hydrocarbons in the enclosure according to the equations in paragraph (d) of this section. The enclosure background emissions shall not be greater than 0.4g for the 4 hours.

(b) *Initial determination of enclosure internal volume.* Prior to its introduction into service the enclosure internal volume shall be determined by the following procedure.

(1) Carefully measure the internal length, width and height of the enclosure, accounting for irregularities (such as braces) and calculate the internal volume.

(2) Perform an enclosure calibration check according to subparagraphs (1) through (7) of paragraph (c) of this section.

(3) If the calculated mass does not agree within 2 percent of the injected propane mass, then corrective action is required.

(c) *Hydrocarbon retention check and calibration.* The hydrocarbon retention check provides a check upon the calculated volume and also measures the leak rate. Prior to its introduction into service and at least monthly thereafter the enclosure leak rate shall be determined as follows:

(1) Zero and span (calibrate if required) the hydrocarbon analyzer.

(2) Purge the enclosure until a stable background hydrocarbon reading is obtained.

(3) Turn on the mixing blower (if not already on).

(4) Seal enclosure and measure background hydrocarbon concentration, temperature and barometric pressure. These are the initial readings C_{HCi}, T_i and P_{Bi} for the enclosure calibration.

(5) Inject into the enclosure a known quantity of pure propane. (4 g is a convenient quantity.) The propane may be measured by volume flow or by mass measurement. The method used to measure the propane shall have an accuracy and precision of ±0.5 percent of the measured value.

(6) After a minimum of 5 minutes of mixing, analyze the enclosure atmosphere for hydrocarbon content, also record temperature and pressure. These measurements are the final readings for the enclosure calibration as well as the initial readings for the retention check.

(7) To verify the enclosure calibration calculate the mass of propane using the measurements taken in steps (4) and (6). See paragraph (d) of this section. This quantity must be within ±2 percent of that measured in step 5 above.

(8) Allow the enclosure to remain sealed for a minimum of 4 hours without sampling and with the mixing blower operating. After 4 hours analyze the enclosure atmosphere for hydrocarbon content; record temperature and barometric pressure. These are the final readings for the hydrocarbon retention check.

(9) Calculate, using the equations in paragraph (d) of this section and the readings taken in (8), the hydrocarbon mass. It may not differ by more than 4 percent of the value in step (6).

(d) *Calculations.* The calculation of net hydrocarbon mass change is used to determine enclosure background and leak rate. It is also used to check the enclosure volume measurements. The mass change is calculated from the initial and final readings of hydrocarbon concentration, temperature and pressure according to the following equation:

$$M_{HC} = kV \times 10^{-4}[(C_{HCf}P_{Bf}/T_f) - (C_{HCi}P_{Bi}/T_i)]$$

where:

M_{HC} = Hydrocarbon mass change, g.
C_{HC} = Hydrocarbon concentration as ppm carbon.
V = Enclosure volume, ft^3 (m^3), as measured in paragraph (b)(1) of this section.
P_B = Barometric pressure, in. Hg (kPa).
T = Enclosure ambient temperature, R(K).
k = 3.05.

for SI units,

k = 17.60.
i = Indicates initial reading.
f = Indicates final reading.

NOTE: Hydrocarbon concentration is stated in ppm carbon, that is, ppm propane x3. Expressions in parenthesis are for SI units.

§ 86.118-78 Dynamometer calibration.

(a) The dynamometer shall be calibrated at least once each month or performance verified at least once each week and then calibrated as required. The calibration shall consist of the manufacturer's recommended calibration procedure plus a determination of the dynamometer frictional power absorption at 50.0 mph (80.5 km/h). One method for determining dynamometer frictional power absorption at 50.0 mph (80.5 km/h) is described below, other methods may be used if shown to yield equivalent results. The measured absorbed road power includes the dynamometer friction as well as the power absorbed by the power absorption unit. The dynamometer is driven above the test speed range. The device used to drive the

dynamometer is then disengaged from the dynamometer and the roll(s) is (are) allowed to coast down. The kinetic energy of the system is dissipated by the dynamometer. This method neglects the variations in roll bearing friction due to the drive axle weight of the vehicle. The inertia of the free (rear) roll may be neglected in the case of dynamometers with paired rolls.

(1) Devise a method to determine the speed of the drive roll if it is not already measured. A fifth wheel, revolution pickup, or other suitable means may be used.

(2) Place a vehicle on the dynamometer or devise another method of driving the dynamometer.

(3) Engage the inertial flywheel or other inertial simulation system for the most common vehicle mass category for which the dynamometer is used. In addition other vehicle mass categories may be calibrated, if desired.

(4) Drive the dynamometer up to 50.0 mph (80.5 km/h).

(5) Record indicated road power.

(6) Drive the dynamometer up to 60.0 mph (96.9 km/h).

(7) Disengage the device used to drive the dynamometer.

(8) Record the time for the dynamometer drive roll to coastdown from 55.0 mph (88.5 km/h) to 45 mph (72.4 km/h).

(9) Adjust the power absorption unit to a different level.

(10) Repeat steps (4) to (9) above sufficient times to cover the range of road power used.

(11) Calculate absorbed road power (HP_d). See paragraph (c) of this section.

(12) Plot indicated road load power at 50 mph (80.5 km/h) versus road load power at 50 mph (80.5 km/h) as shown in Figure B78-5.

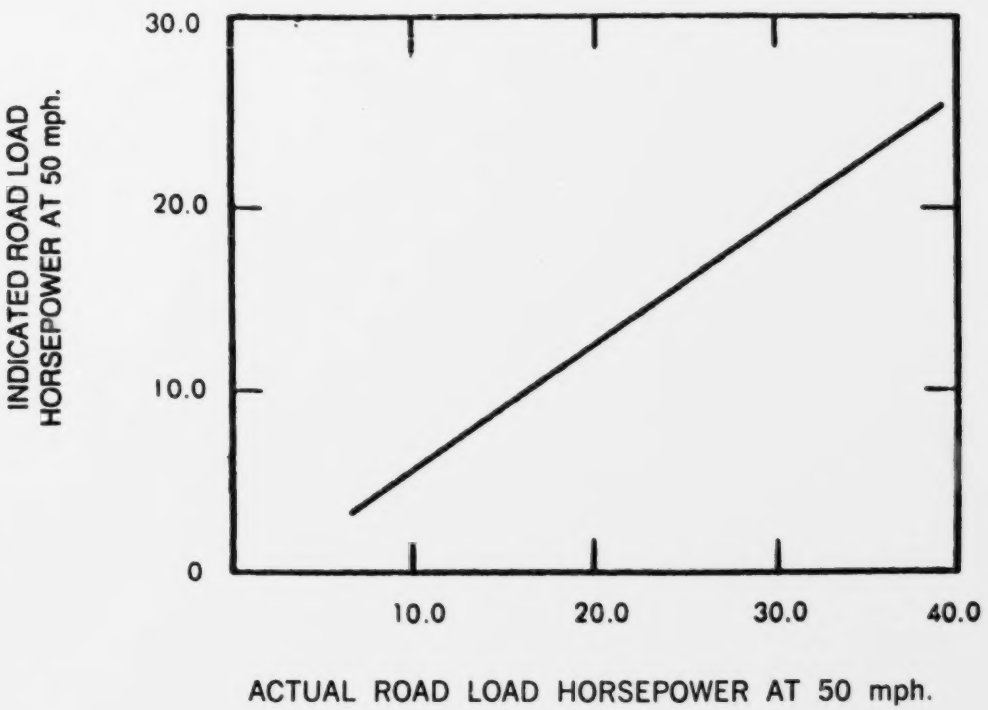

FIGURE B78-5—ROAD LOAD HORSEPOWER, ACTUAL VS. INDICATED

(b) The performance check consists of conducting a dynamometer coastdown at one or more inertia-horsepower settings and comparing the coastdown time to that recorded during the last calibration. If the coastdown times differ by more than 1 s, a new calibration is required.

(c) *Calculations.* The road load power actually absorbed by the dynamometer is calculated from the following equation:

$$HP_d = (1/2)(W/32.2)(V_1^2 - V_2^2)/550t$$

where:

HP_d = Power, horsepower (kilowatts)
W = Equivalent inertia, lb (kg)
V_1 = Initial Velocity, ft/s (m/s) (55 mph = 88.5 km/h = 80.67 ft/s = 24.58 m/s)
V_2 = Final Velocity, ft/s (m/s) (45 mph = 72.4 km/h = 66 ft/s = 20.11 m/s)
t = elapsed time for rolls to coast from 55 mph to 45 mph (88.5 to 72.4 km/h)

(Expressions in parenthesis are for SI units.) When the coastdown is from 55 to 45 mph (88.5 to 72.4 km/h) the above equation reduces to:

$HP_d = 0.06073\ (W/t)$
for SI units,
$HP_d = 0.09984\ (W/t)$

§ 86.119-78 CVS calibration.

The CVS is calibrated using an accurate flowmeter and restrictor valve. Measurements of various parameters are made and related to flow through the unit. Procedures used by EPA for both PDP and CFV are outlined below. Other procedures yielding equivalent results may be used if approved in advance by the Administrator. After the calibration curve has been obtained, verification of the entire system can be performed by injecting a known mass of gas into the system and comparing the mass indicated by the system to the true mass injected. An indicated error does not necessarily mean that the calibration is wrong, since other factors can influence the accuracy of the system, e.g. analyzer calibration. A verification procedure is found in paragraph (c) of this section.

(a) *PDP calibration.* (1) The following calibration procedure outlines the equipment, the test configuration, and the various parameters which must be measured to establish the flow rate of the CVS pump. All the parameters related to the pump are simultaneously measured with the parameters related to a flowmeter which is connected in series with the pump. The calculated flow rate ft^3/min. (at pump inlet absolute pressure and temperature) can then be plotted versus a correlation function which is the value on a specific combination of pump parameters. The linear equation which relates the pump flow and the correlation function is then determined. In the event that a CVS has a multiple speed drive, a calibration for each range used must be performed.

(2) This calibration procedure is based on the measurement of the absolute values of the pump and flowmeter parameters that relate the flow rate at each point. Three conditions must be maintained to assure the accuracy and integrity of the calibration curve. First, the pump pressures should be measured at taps on the pump rather than at the external piping on the pump inlet and outlet. Pressure taps that are mounted at the top center and bottom center of the pump drive headplate are exposed to the actual pump cavity pressures, and therefore reflect the absolute pressure differentials. Secondly, temperature stability must be maintained during the calibration. The laminar flowmeter is sensitive to inlet temperature oscillations which cause the data points to be scattered. Gradual changes (±2° F (1.1° C)) in temperature are acceptable as long as they occur over a period of several minutes. Finally, all connections between the flowmeter and the CVS pump must be absolutely void of any leakage.

(3) During an exhaust emission test the measurement of these same pump parameters enables the user to calculate the flow rate from the calibration equation.

(4) Connect a system as shown in Figure B78-6. Although particular types of equipment are shown, other configurations that yield equivalent results may be used if approved in advance by the Administrator. For the system indicated, the following data with given accuracy are required:

CALIBRATION DATA MEASUREMENTS

Parameter	Symbol	Units	Tolerances
Barometric pressure (corrected)	P_B	Inches Hg (kPa)	± .01 in Hg (± .034 kPa)
Ambient temperature	T_A	F (C)	± 5 F (± 28 C)
Air temperature into LFE	ETI	F (C)	± 25 F (± 14 C)
Pressure depression upstream of LFE	EPI	Inches H_2O (kPa)	± 05 in H_2O (± 012 kPa)
Pressure drop across the LFE matrix	EDP	Inches H_2O (kPa)	± 005 in H_2O (± 001 kPa)
Air temperature at CVS pump inlet	PTI	F (C)	± 5 F (± 28 C)
Pressure depression at CVS pump inlet	PPI	Inches fluid (kPa)	± 05 in fluid (± 022 kPa)
Specific gravity of manometer fluid (1 75 oil)	Sp. Gr		
Pressure head at CVS pump outlet	PPO	Inches fluid (kPa)	± 05 in fluid (± 022 kPa)
Air temperature at CVS pump outlet (optional)	PTO	F (C)	± 5 F (± 28 C)
Pump revolutions during test period	N	Revs	± 1 Rev
Elapsed time for test period	t	s	± 05 s

(5) After the system has been connected as shown in Figure B78-6, set the variable restrictor in the wide open position and run the CVS pump for 20 minutes. Record the calibration data.

(6) Reset the restrictor valve to a more restricted condition in an increment of pump inlet depression (about 4" H_2O(1.0 kPa) that will yield a minimum of six data points for the total calibration. Allow the system to stabilize for 3 minutes and repeat the data acquisition.

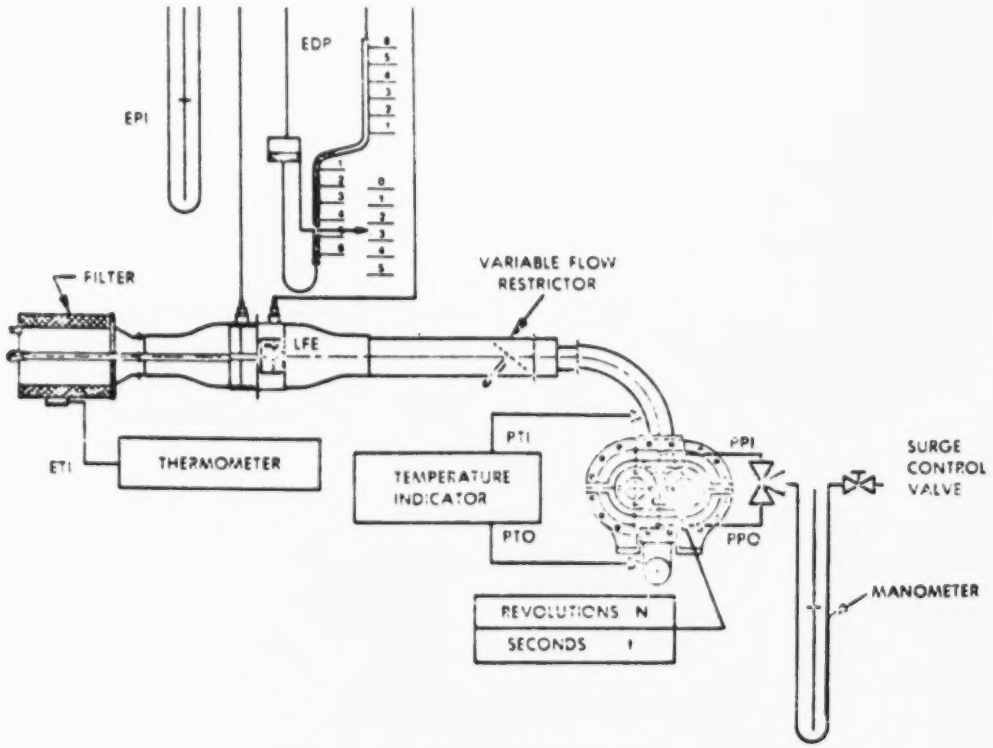

FIGURE B78-6—PDP-CVS CALIBRATION CONFIGURATION

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(7) Data analysis:

(i) The air flow rate, Qs, at each test point is calculated in standard cubic feet per minute from the flowmeter data using the manufacturer's prescribed method.

(ii) The air flow rate is then converted to pump flow, V_o, in cubic feet per revolution at absolute pump inlet temperature and pressure.

$$V_o = Qs/n \cdot T_p/528 \cdot 29.92/P_p$$

where:

V_o = Pump flow, ft³/revolution (m³/revolution) at T_p, P_p

Qs = Meter air flow rate in standard cubic feet per minute, standard conditions are 68 F, 29.92 in. Hg (20 C, 101.3 kPa).

n = Pump speed in revolutions per minute.

T_p = Pump inlet temperature, R(K) = PTI + 460

for SI units, T_p = PTI + 273

P_p = Absolute pump inlet pressure, in. Hg (kPa) = P_B − PPI (SP. GR./13.57)

for SI units, $P_p = P_B$ − PPI

Where:

P_B = barometric pressure, in. Hg (kPa)

PPI = Pump inlet depression, in. fluid (kPa)

SP. GR. = Specific gravity of manometer fluid relative to water.

(iii) The correlation function at each test point is then calculated from the calibration data:

$$X_o = \frac{1}{n}\sqrt{\frac{\Delta P_p}{P_e}}$$

where:

X_o = correlation function.

P_p = The pressure differential from pump inlet to pump outlet, in. Hg (kPa) = $P_e - P_p$

P_e = Absolute pump outlet pressure, in. Hg (kPa) = P_B + PPO (SP. GR./13.57)

for SI units, $P_e = P_B$ + PPO

where:

PPO = Pressure head at pump outlet, in. fluid (kPa)

(iv) A linear least squares fit is performed to generate the calibration equations which have the forms:

$$V_o = D_o - M(X_o)$$
$$n = A - B(P_p)$$

D_o, M, A, and B are the slope-intercept constants describing the lines.

(8) A CVS system that has multiple speeds should be calibrated on each speed used. The calibration curves generated for the ranges will be approximately parallel and the intercept values, D_o, will increase as the pump flow range decreases.

(9) If the calibration has been performed carefully, the calculated values from the equation will be within ±0.50 percent of the measured value of V_o. Values of M will vary from one pump to another, but values of D_o for pumps of the same make, model, and range should agree within ±3 percent of each other. Particulate influx from use will cause the pump slip to decrease as reflected by lower values for M. Calibrations should be performed at pump start-up and after major maintenance to assure the stability of the pump slip rate. Analysis of mass injection data will also reflect pump slip stability.

(b) *CFV calibration.* (1) Calibration of the CFV is based upon the flow equation for a critical venturi. Gas flow is a function of inlet pressure and temperature:

$$Q_s = \frac{K_v P}{\sqrt{T}}$$

where:

Q_s = Flow

K_v = Calibration coefficient

P = Absolute pressure

T = Absolute temperature

The calibration procedure described below establishes the value of the calibration coefficient at measured values of pressure, temperature and air flow.

(2) The manufacturer's recommended procedure shall be followed by calibrating electronic portions of the CFV.

(3) Measurements necessary for flow calibration are as follows:

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CALIBRATION DATA MEASUREMENTS

Parameter	Symbol	Units	Tolerances
Barometric pressure (corrected)	P_B	Inches Hg (kPa)	.01in Hg (.034 kPa)
Air temperature, flowmeter	ETI	F (C)	.25 F (.14 C)
Pressure depression upstream of LFE	EPI	Inches H_2O (kPa)	.05 in H_2O (.012 kPa)
Pressure drop across LFE matrix	EDP	Inches H_2O (kPa)	.005 in H_2O (.001 kPa)
Air flow	Q_s	Ft ^{3}/min. (m^3/min.)	5 pct
CFV inlet depression	PPI	Inches fluid (kPa)	.05 in fluid (.022 kPa)
Temperature at venturi inlet	T_v	F (C)	5 F (2.8 C)
Specific gravity of manometer fluid (1.75 oil)	Sp. Gr		

(4) Set up equipment as shown in Figure B78-7 and check for leaks. Any leaks between the flow measuring device and the critical flow venturi will seriously affect the accuracy of the calibration.

(5) Set the variable flow restrictor to the open position, start the blower, and allow the system to stabilize. Record data from all instruments.

(6) Vary the flow restrictor and make at least 8 readings across the critical flow range of the venturi.

(7) Data analysis: The data recorded during the calibration are to be used in the following calculations:

(i) The air flow rate, Qs, at each test point is calculated in standard cubic feet per minute from the flow meter data using the manufacturer's prescribed method.

(ii) Calculate values of the calibration coefficient for each test point:

$$K_v = \frac{Q_s \sqrt{T_v}}{P_v}$$

where:

Q_s = Flow rate in standard cubic feet per minute, standard conditions are 68 F, 29.92 in. Hg (20 C, 101.3 kPa).

T_v = Temperature at venturi inlet, $R(K)$.

P_v = Pressure at venturi inlet, mm Hg (kPa) = P_B – PPI (SP. GR./13.57).

for SI units $P_v = P_B$ – PPI.

where:

PPI = Venturi inlet pressure depression, in. fluid (kPa).

SP. GR. = Specific gravity of manometer fluid, relative to water.

(iii) Plot K_v as a function of venturi inlet pressure. For sonic flow K_v will have a relatively constant value. As pressure decreases (vacuum increases) the venturi becomes unchoked and K_v decreases. See Figure B78-8.

(iv) For a minimum of 8 points in the critical region calculate an average K_v and the standard deviation.

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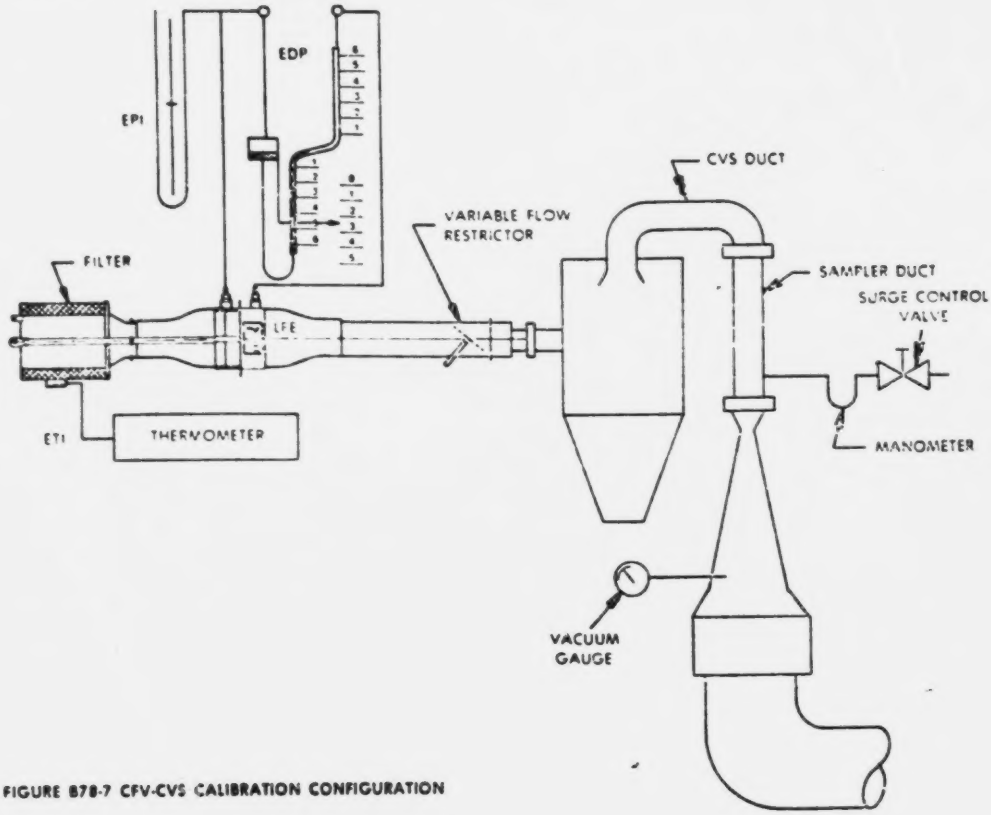

FIGURE B78-7 CFV-CVS CALIBRATION CONFIGURATION

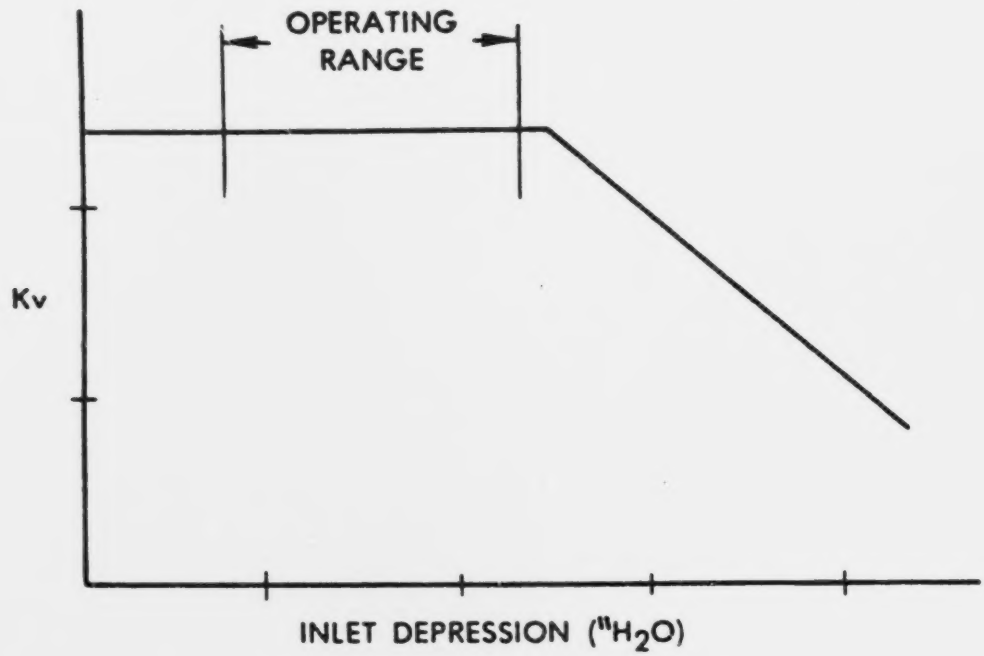

FIGURE B78-8—SONIC FLOW CHOKING

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(A) Initial and periodic optimization of detector response. Prior to its introduction into service and at least annually thereafter the FID hydrocarbon analyzer shall be adjusted for optimum hydrocarbon response. Alternate methods yielding equivalent results may be used, if approved in advance by the Administrator.

(*1*) Follow the manufacturer's instructions for instrument startup and basic operating adjustment using the appropriate fuel and zero-grade air.

(*2*) Optimize on the most common operating range. Introduce into the analyzer, a propane in air mixture with a propane concentration equal to approximately 90 percent of the most common operating range.

(*3*) Select an operating fuel flow rate that will give near maximum response and least variation in response with minor fuel flow variations.

(*4*) To determine the optimum air flow, use the fuel flow setting determined above and vary air flow.

(*5*) After the optimum flow rates have been determined, they are recorded for future reference.

(B) Initial and periodic calibration. Prior to its introduction into service and monthly thereafter the FID hydrocarbon analyzer shall be calibrated on all normally used instrument ranges. Use the same flow rate as when analyzing samples.

(*1*) Adjust analyzer to optimize performance.

(*2*) Zero the hydrocarbon analyzer with zero-grade air.

(*3*) Calibrate on each normally used operating range with propane in air calibration gases having nominal concentrations of 15, 30, 45, 60, 75, and 90 percent of that range. For each range calibrated, if the deviation from a least-squares best-fit straight line is 2 percent or less of the value at each data point, concentration values may be calculated.

(v) If the standard deviation exceeds 0.3 percent of the average K_v take corrective action.

(c) *CVS System Verification.* The following "gravimetric" technique can be used to verify that the CVS and analytical instruments can accurately measure a mass of gas that has been injected into the system. (Verification can also be accomplished by constant flow metering using critical flow orifice devices.)

(1) Obtain a small cylinder that has been charged with pure propane or carbon monoxide gas (caution—carbon monoxide is poisonous).

(2) Determine a reference cylinder weight to the nearest 0.01 grams.

(3) Operate the CVS in the normal manner and release a quantity of pure propane or carbon monoxide into the system during the sampling period (approximately 5 minutes).

(4) The calculations of § 86.144 are performed in the normal way except, in the case of propane. The density of propane (17.30 g/ft^3/carbon atom (0.6109 kg/m^3/carbon atom)) is used in place of the density of exhaust hydrocarbons. In the case of carbon monoxide, the density of 32.97 g/ft^3 (1.164 kg/m^3) is used.

(5) The gravimetric mass is subtracted from the CVS measured mass and then divided by the gravimetric mass to determine the percent accuracy of the system.

(6) The cause for any discrepancy greater than ±2 percent must be found and corrected.

§ 86.120-78 [Reserved]

§ 86.120-82 Gas meter or flow instrumentation calibration, particulate measurement.

Sampling for particulate emissions requires the use of gas meters or flow instrumentation to measure flow through the particulate filters. The meters or instrumentation shall receive initial and periodic calibrations as follows:

(a) Install a standard air flow measurement device upstream of the gas meter or instrument being calibrated. This standard device shall measure air flow at standard conditions with an accuracy of ±1 percent. Standard conditions are defined as 68°F (20°C) and 29.92 in. Hg (101.3 kPa). A critical flow orifice, a bellmouth, or a laminar flow element is recommended as the standard device.

(b) Flow air through the calibration system at the sample flow rate used for particulate testing and at the

backpressure which occurs during the sample test.

(c) When the temperature and pressure in the system have stabilized, measure the gas meter or instrument indicated volume over a time period of at least 5 minutes and until a flow volume of at least ±1 percent accuracy can be determined by the standard device. Record the stabilized air temperature and pressure upstream of the gas meter or instrument being calibrated and as required for the standard device.

(d) Calculate air flow at standard conditions as measured by both the standard device and the gas meter or instrument being calibrated.

(e) Repeat the procedures of paragraphs (b) through (d) of this section using flow rates which are 10 percent above the nominal sampling flow rate and 10 percent below the nominal sampling flow rate.

(f) If the air flow at standard conditions measured by the gas meter or instrument being calibrated differs by more than ±1 percent from the standard measurement at any of the three measured flow rates, then a correction shall be made by either of the following two methods:

(1) Mechanically adjust the gas meter or instrument so that it agrees within 1 percent of the standard measurement at the three specified flow rates, or

(2) Develop a continuous best fit calibration curve for the gas meter (as a function of the standard device flow measurement) from the three calibration points that represents the data to within 1 percent at all points to determine corrected flow.

(g) *Other systems.* A bell prover may be used to calibrate the gas meter if the procedure outlined in ANSI B109.1-1973 is used. Prior approval by the Administrator is not required to use the bell prover.

[45 FR 14515, Mar. 5, 1980]

§ 86.121-78 Hydrocarbon analyzer calibration.

The FID hydrocarbon analyzer shall receive the following initial and periodic calibration. The HFID shall be operated to a set point ±10°F (±5.5°C) between 300 and 390° F (149 and 199° C).

(a) Initial and periodic optimization of detector response. Prior to its introduction into service and at least annually thereafter the FID hydrocarbon analyzer shall be adjusted for optimum hydrocarbon response. Alternate methods yielding equivalent results may be used, if approved in advance by the Administrator.

(1) Follow the manufacturer's instructions for instrument startup and basic operating adjustment using the appropriate fuel and zero-grade air.

(2) Optimize on the most common operating range. Introduce into the analyzer, a propane in air mixture with a propane concentration equal to approximately 90 percent of the most common operating range.

(3) Select an operating fuel flow rate that will give near maximum response and least variation in response with minor fuel flow variations.

(4) To determine the optimum air flow, use the fuel flow setting determined above and vary air flow.

(5) After the optimum flow rates have been determined, they are recorded for future reference.

(b) Initial and periodic calibration. Prior to its introduction into service and monthly thereafter the FID hydrocarbon analyzer shall be calibrated on all normally used instrument ranges. Use the same flow rate as when analyzing samples.

(1) Adjust analyzer to optimize performance.

(2) Zero the hydrocarbon analyzer with zero-grade air.

(3) Calibrate on each normally used operating range with propane in air calibration gases having nominal concentrations of 15, 30, 45, 60, 75, and 90 percent of that range. For each range calibrated, if the deviation from a least-squares best-fit straight line is 2 percent or less of the value at each data point, concentration values may be calculated by use of a single calibration factor for that range. If the deviation exceeds 2 percent at any point, the best-fit nonlinear equation which represents the data to within 2 percent of each test point shall be used to determine concentration.

[42 FR 32964, June 28, 1977, as amended at 42 FR 45652, Sept. 12, 1977]

§ 86.121-82 Hydrocarbon analyzer calibration.

The FID hydrocarbon analyzer shall receive the following initial and periodic calibration. The HFID shall be operated at a temperature of 375 F ± 10 F (191 ± 6 C).

(a) *Initial and periodic optimization of detector response.* Prior to its introduction into service and at least annually thereafter, the FID hydrocarbon analyzer shall be adjusted for optimum hydrocarbon response. Alternate methods yielding equivalent results may be used, if approved in advance by the Administrator.

(1) Follow the manufacturer's instructions or good engineering practice for instrument startup and basic operating adjustment using the appropriate fuel and zero-grade air.

(2) Optimize on the most common operating range. Introduce into the analyzer a propane in air mixture with a propane concentration equal to approximately 90 percent of the most common operating range.

(3) Select an operating fuel flow rate that will give near maximum response and least variation in response with minor fuel flow variations.

(4) To determine the optimum air flow, use the fuel flow setting determined above and vary air flow.

(5) After the optimum flow rates have been determined, record them for future reference.

(b) *Initial and periodic calibration.* Prior to its introduction into service and monthly thereafter the FID hydrocarbon analyzer shall be calibrated on all normally used instrument ranges. Use the same flow rate as when analyzing sample.

(1) Adjust analyzer to optimize performance.

(2) Zero the hydrocarbon analyzer with zero-grade air.

(3) Calibrate on each normally used operating range with propane in air calibration gases having nominal concentrations of 15, 30, 45, 60, 75, and 90 percent of that range. For each range calibrated, if the deviation from a least squares best-fit straight line is 2 percent or less of the value at each data point, concentration values may be calculated by use of a single calibration factor for that range. If the deviation exceeds 2 percent at any point, the best-fit non-linear equation which represents the data to within 2 percent of each test point shall be used to determine concentration.

[45 FR 14516, Mar. 5, 1980]

§ 86.122-78 Carbon monoxide analyzer calibration.

The NDIR carbon monoxide analyzer shall receive the following initial and periodic calibrations:

(a) *Initial and periodic interference check.* Prior to its introduction into service and annually thereafter the NDIR carbon monoxide analyzer shall be checked for response to water vapor and CO_2:

(1) Follow the manufacturer's instructions for instrument startup and operation. Adjust the analyzer to optimize performance on the most sensitive range to be used.

(2) Zero the carbon monoxide analyzer with either zero-grade air or zero-grade nitrogen.

(3) Bubble a mixture of 3 percent CO_2 in N_2 through water at room temperature and record analyzer response.

(4) An analyzer response of more than 1 percent of full scale for ranges above 300 ppm full scale or of more than 3 ppm on ranges below 300 ppm full scale will require corrective action. (Use of conditioning columns is one form of corrective action which may be taken.)

(b) *Initial and periodic calibration.* Prior to its introduction into service and monthly thereafter the NDIR carbon monoxide analyzer shall be calibrated.

(1) Adjust the analyzer to optimize performance.

(2) Zero the carbon monoxide analyzer with either zero-grade air or zero-grade nitrogen.

(3) Calibrate on each normally used operating range with carbon monoxide in N_2 calibration gases having nominal concentrations of 15, 30, 45, 60, 75, and 90 percent of that range. Additional calibration points may be generated. For each range calibrated, if the deviation from a least-squares best-fit

straight line is 2 percent or less of the value at each data point, concentration values may be calculated by use of a single calibration factor for that range. If the deviation exceeds 2 percent at any point, the best-fit nonlinear equation which represents the data to within 2 percent of each test point shall be used to determine concentration.

§ 86.123–78 Oxides of nitrogen analyzer calibration.

The chemiluminescent oxides of nitrogen analyzer shall receive the following initial and periodic calibration.

(a) Prior to its introduction into service and weekly thereafter the chemiluminescent oxides of nitrogen analyzer shall be checked for NO_2 to NO converter efficiency. Figure B78-9 is a reference for the following steps:

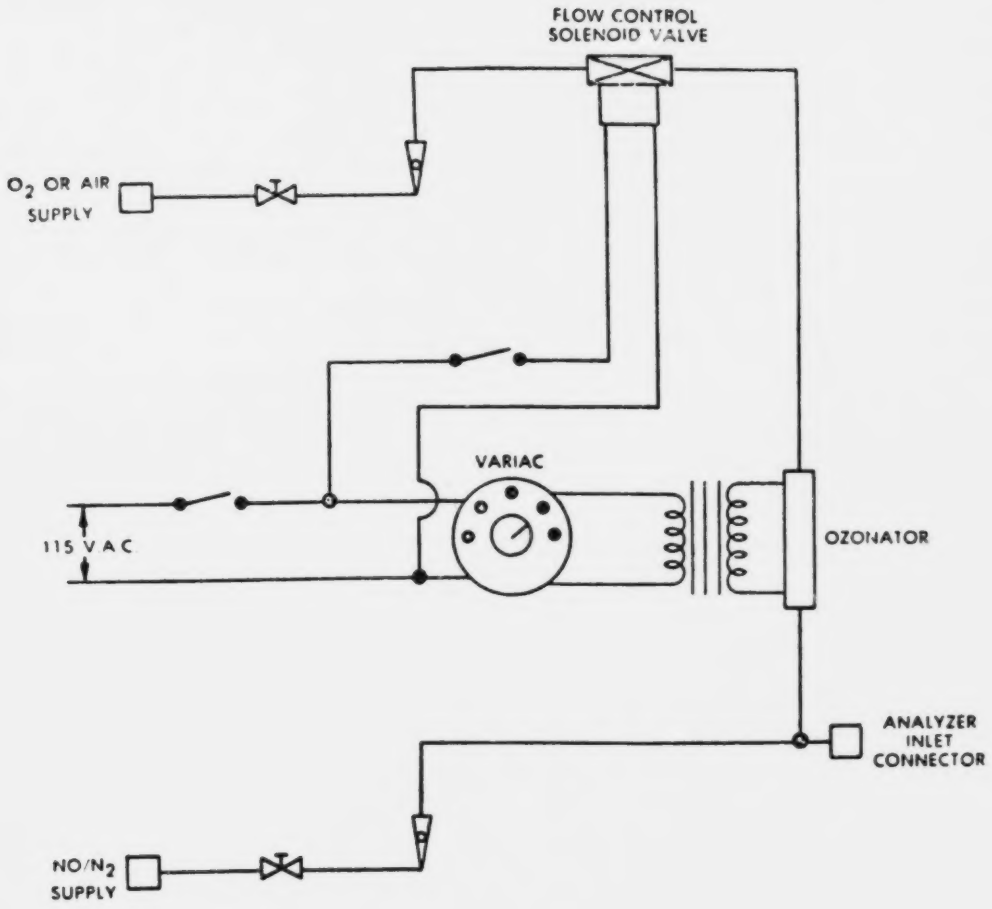
(1) Follow the manufacturer's instructions for instrument startup and operation. Adjust the analyzer to optimize performance.

(2) Zero the oxides of nitrogen analyzer with zero-grade air or zero-grade nitrogen.

(3) Connect the outlet of the NOx generator to the sample inlet of the oxides of nitrogen analyzer which has been set to the most common operating range.

(4) Introduce into the NOx generator analyzer-system an NO in nitrogen (N_2) mixture with an NO concentration equal to approximately 80 percent of the most common operating range. The NO_2 content of the gas mixture shall be less than 5 percent of the NO concentration.

(5) With the oxides of nitrogen analyzer in the NO mode, record the concentration of NO indicated by the analyzer.



(SEE FIG B78-3 FOR SYMBOL LEGEND)

FIGURE B78-9—NOx CONVERTER EFFICIENCY DETECTOR

(6) Turn on the NOx generator O_2 (or air) supply and adjust the O_2 (or air) flow rate so that the NO indicated by the analyzer is about 10 percent less than indicated in step (5). Record the concentration of NO in this $NO+O_2$ mixture.

(7) Switch the NOx generator to the generation mode and adjust the generation rate so that the NO measured on the analyzer is 20 percent of that measured in step (5). There must be at least 10 percent unreacted NO at this point. Record the concentration of residual NO.

(8) Switch the oxides of nitrogen analyzer to the NOx mode and measure total NOx. Record this value.

(9) Switch off the NOx generation but maintain gas flow through the system. The oxides of nitrogen analyzer will indicate the NOx in the $NO+O_2$ mixture. Record this value.

(10) Turn off the NOx generator O_2 (or air) supply. The analyzer will now indicate the NOx in the original NO in N_2 mixture. This value should be no more than 5 percent above the value indicated in step (4).

(11) Calculate the efficiency of the NOx converted by substituting the concentrations obtained into the following equation:

$$\text{Percent Eff.} = (1 + a - b/c - d) \cdot 100$$

where

a = concentration obtained in step (8).
b = concentration obtained in step (9).
c = concentration obtained in step (6).
d = concentration obtained in step (7).

If converter efficiency is not greater than 90 percent corrective action will be required.

(b) Initial and periodic calibration. Prior to its introduction into service and monthly thereafter the chemiluminescent oxides of nitrogen analyzer shall be calibrated on all normally used instrument ranges. Use the same flow rate as when analyzing samples. Proceed as follows:

(1) Adjust analyzer to optimize performance.

(2) Zero the oxides of nitrogen analyzer with zero-grade air or zero-grade nitrogen.

(3) Calibrate on each normally used operating range with NO in N2 calibration gases having nominal concentrations of 15, 30, 45, 60, 75, and 90 percent of that range. For each range calibrated, if the deviation from a least-squares best-fit straight line is 2 percent or less of the value at each data point, concentration values may be calculated by use of a single calibration factor for that range. If the deviation exceeds 2 percent at any point, the best-fit non-linear equation which represents the data to within 2 percent of each test point shall be used to determine concentration.

[42 FR 32954, June 28, 1977, as amended at 42 FR 45652, Sept. 12, 1977]

§ 86.124-78 Carbon dioxide analyzer calibration.

Prior to its introduction into service and monthly thereafter the NDIR carbon dioxide analyzer shall be calibrated:

(a) Follow the manufacturer's instructions for instrument startup and operation. Adjust the analyzer to optimize performance.

(b) Zero the carbon dioxide analyzer with either zero-grade air or zero-grade nitrogen.

(c) Calibrate on each normally used operating range with carbon dioxide in N_2 calibration gases with nominal concentrations of 15, 30, 45, 60, 75, and 90 percent of that range. Additional calibration points may be generated. For each range calibrated, if the deviation from a least-squares best-fit straight line is 2 percent or less of the value at each data point, concentration values may be calculated by use of a single calibration factor for that range. If the deviation exceeds 2 percent at any point, the best-fit non-linear equation which represents the data to within 2 percent of each test point shall be used to determine concentration.

§ 86.125-78 [Reserved]

§ 86.126-78 Calibration of other equipment.

Other test equipment used for testing shall be calibrated as often as required by the manufacturer or as necessary according to good practice.

§ 86.127-78 Test procedures; overview.

The procedures described in this and subsequent sections are used to determine the conformity of vehicles with the standards set forth in Subpart A for light-duty vehicles and light-duty trucks.

(a) The overall test consists of prescribed sequences of fueling, parking, and operating conditions. Vehicles are either tested for only exhaust emissions or are tested for exhaust and evaporative emissions. The evaporative portion of the test procedure occurs before and after the exhaust emission test, and, in some cases, during the exhaust emission test.

(b) The exhaust emission test is designed to determine hydrocarbon, carbon monoxide, and oxides of nitrogen mass emissions while simulating an average trip in an urban area of 7.5 miles (12.1 km). The test consists of engine startups and vehicle operation on a chassis dynamometer, through a

specified driving schedule. A proportional part of the diluted exhaust emissions is collected continuously for subsequent analysis, using a constant volume (variable dilution) sampler (Diesel dilute exhaust is continuously analyzed for hydrocarbons using a heated sample line and analyzer).

(c) The evaporative emission test (gasoline-fueled vehicles only) is designed to determine hydrocarbon evaporative emissions as a consequence of diurnal temperature fluctuation, urban driving, and hot soaks during parking. It is associated with a series of events representative of a motor vehicle's operation, which result in hydrocarbon vapor losses. The test procedure is designed to measure:

(1) Diurnal breathing losses resulting from daily temperature changes, measured by the enclosure technique;

(2) Running losses from suspected sources (if indicated by engineering analysis or vehicle inspection) resulting from a simulated trip on a chassis dynamometer, measured by carbon traps; and

(3) Hot soak losses which result when the vehicle is parked and the hot engine is turned off, measured by the enclosure technique.

(d) Except in cases of component malfunction or failure, all emission control systems installed on or incorporated in a new motor vehicle shall be functioning during all procedures in this subpart. Maintenance to correct component malfunction or failure shall be authorized in accordance with § 86.078-25.

§ 86.127-82 Test procedures; overview.

The procedures described in this and subsequent sections are used to determine the conformity of vehicles with the standards set forth in subpart A for light-duty vehicles and light-duty trucks.

(a) The overall test consists of prescribed sequences of fueling, parking and operating conditions. Vehicles are tested for any or all of the following emissions:

(1) Gaseous exhaust HC, CO, NO_x, CO_2 (both gasoline-fueled and diesel vehicles).

(2) Particulates (diesels only).

(3) Evaporative HC (gasoline-fueled vehicles only).

The evaporative portion of the test procedure occurs before and after the exhaust emission test, and in some cases, during the exhaust emission test.

(b) The gasoline-fueled exhaust emission test is designed to determine hydrocarbon, carbon monoxide, and oxides of nitrogen mass emissions while simulating an average trip in an urban area of 7.5 miles (12.1 kilometers). The test consists of engine startups and vehicle operation on a chassis dynamometer, through a specified driving schedule. A proportional part of the diluted exhaust is collected continuously for subsequent analysis, using a constant volume (variable dilution) sampler or critical flow venturi sampler.

(c) The diesel exhaust emission test is designed to determine particulate and gaseous mass emissions during a test similar to the test in § 86.127-82(b). Dilute exhaust is continuously analyzed for total hydrocarbons using a heated sample line and analyzer. The other gaseous emissions, CO, CO_2 and NO_x are collected continuously for analysis as in § 86.127-82(b). Simultaneous with the gaseous exhaust collection and analysis, particulates from a proportional part of the diluted exhaust are collected continuously on a filter. The mass of particulate is determined by the procedure described in § 86.139. This testing requires a dilution tunnel as well as the constant volume sampler.

(d) The evaporative emission test (gasoline-fueled vehicles only) is designed to determine hydrocarbon evaporative emissions as a consequence of diurnal temperature fluctuation, urban driving, and hot soaks during parking. It is associated with a series of events representative of a motor vehicle's operation, which result in hydrocarbon vapor losses. The test procedure is designed to measure:

(1) Diurnal breathing losses resulting from daily temperature changes, measured by the enclosure technique;

(2) Running losses from suspected sources (if indicated by engineering analysis or vehicle inspection) result-

ing from a simulated trip on a chassis dynamometer, measured by carbon traps; and

(3) Hot soak losses, which result when the vehicle is parked and the hot engine is turned off, measured by the enclosure technique.

(e) Except in cases of component malfunction or failure, all emission control systems installed on or incorporated in a new motor vehicle shall be functioning during all procedures in this subpart. Maintenance to correct component malfunction or failure shall be authorized in accordance with § 86.078-25.

[45 FR 14516, Mar. 5, 1980]

§ 86.128-79 Transmissions.

(a) All test conditions, except as noted, shall be run according to the manufacturer's recommendations to the ultimate purchaser, Provided that: Such recommendations are representative of what may reasonably be expected to be followed by the ultimate purchaser under in-use conditions.

(b) Vehicles equipped with free wheeling or overdrive, except as noted, shall be tested with these features operated according to the manufacturer's recommendations to the ultimate purchaser.

(c) Idle modes shall be run with automatic transmission in "Drive" and the wheels braked; manual transmissions shall be in gear with the clutch disengaged, except first idle (see §§ 86.136 and 137).

(d) The vehicle shall be driven with minimum accelerator pedal movement to maintain the desired speed.

(e) Accelerations shall be driven smoothly following representative shift speeds and procedures. For manual transmissions, the operator shall release the accelerator pedal during each shift and accomplish the shift with minimum time. If the vehicle cannot accelerate at the specified rate, the vehicle shall be operated at maximum available power until the vehicle speed reaches the value prescribed for that time in the driving schedule.

(f) The deceleration modes shall be run in gear using brakes or accelerator pedal as necessary to maintain the desired speed. Manual transmission vehicles shall have the clutch engaged and shall not change gears from the previous mode. For those modes which decelerate to zero, manual transmission clutches shall be depressed when the speed drops below 15 mph (24.1 km/h), when engine roughness is evident, or when engine stalling is imminent.

(g)(1) In the case of test vehicles equipped with manual transmissions, the transmission shall be shifted in accordance with procedures which are representative of shift patterns that may reasonably be expected to be followed by vehicles in use, in terms of such variables as vehicle speed or percent rated engine speed. At the Administrator's discretion, a test vehicle may also be shifted according to the shift procedures recommended by the manufacturer to the ultimate purchaser, if such procedures differ from those which are reasonably expected to be followed by vehicles in use.

(2) A manufacturer may recommend to the ultimate purchaser shift procedures other than those used in testing by the EPA, Provided that: All shift procedures (including multiple shift speeds) which the manufacturer proposes to supply to the ultimate purchaser are provided to the Administrator as part of the manufacturer's application for certification, or as an amendment to such application, under §§ 86.079-32, -33, or -34.

(h) Downshifting is allowed at the beginning of or during a power mode in accordance with the shift procedure determined in paragraph (g)(1) above.

[43 FR 52921, Nov. 14, 1978]

§ 86.129-80 Road load power test weight and inertia weight class determination.

(a) Flywheels, electrical or other means of simulating test weight as shown in the following table shall be used. If the equivalent test weight specified is not available on the dynamometer being used, the next higher equivalent test weight (not to exceed 250 pounds) available shall be used.

Road load power at 50 mi/h—light duty trucks [1] [4]	Loaded vehicle weight (pounds)	Equivalent test weight (pounds)	Inertia weight class (pounds)
	Up to 1,062	1,000	1,000
	1,063 to 1,187	1,125	1,000
	1,188 to 1,312	1,250	1,250
	1,313 to 1,437	1,375	1,250
	1,438 to 1,562	1,500	1,500
	1,563 to 1,687	1,625	1,500
	1,688 to 1,812	1,750	1,750
	1,813 to 1,937	1,875	1,750
	1,938 to 2,062	2,000	2,000
	2,063 to 2,187	2,125	2,000
	2,188 to 2,312	2,250	2,250
	2,313 to 2,437	2,375	2,250
	2,438 to 2,562	2,500	2,500
	2,563 to 2,687	2,625	2,500
	2,688 to 2,812	2,750	2,750
	2,813 to 2,937	2,875	2,750
	2,938 to 3,062	3,000	3,000
	3,063 to 3,187	3,125	3,000
	3,188 to 3,312	3,250	3,000
	3,313 to 3,437	3,375	3,500
	3,438 to 3,562	3,500	3,500
	3,563 to 3,687	3,625	3,500
	3,688 to 3,812	3,750	3,500
	3,813 to 3,937	3,875	4,000
	3,938 to 4,125	4,000	4,000
	4,126 to 4,375	4,250	4,000
	4,376 to 4,625	4,500	4,500
	4,626 to 4,875	4,750	4,500
	4,876 to 5,125	5,000	5,000
	5,126 to 5,375	5,250	5,000
	5,376 to 5,750	5,500	5,500
	5,751 to 6,250	[5]6,000	6,000
	6,251 to 6,750	6,500	6,500
	6,751 to 7,250	7,000	7,000
	7,251 to 7,750	7,500	7,500
	7,751 to 8,250	8,000	8,000
	8,251 to 8,750	8,500	8,500
	8,751 to 9,250	9,000	9,000
	9,251 to 9,750	9,500	9,500
	9,751 to 10,000	10,000	10,000

[1] For all light duty trucks except vans, and for heavy duty vehicles optionally certified as light duty trucks, the road load power (horsepower) at 50 mi/h shall be 0.58 times B (defined below) rounded to the nearest ½ hp.

[2] For vans, the road load power at 50 mi/h (horsepower) shall be 0.50 times B (defined below) rounded to the nearest ½ hp.

[3] B is the basic vehicle frontal area (square foot) plus the additional frontal area (square foot) of mirrors and optional equipment exceeding 0.1 ft^2 which are anticipated to be sold on more than 33 pct of the car line. Frontal area measurements shall be computed to the nearest 10th of a square foot using a method approved in advanced by the administrator.

[4] Light duty vehicles over 5,750 lb loaded vehicle weight shall be tested at a 5,500 lb equivalent test weight.

(b) *Power absorption unit adjustment—light-duty trucks.* (1) The power absorption unit shall be adjusted to reproduce road load power at 50 mph true speed. The indicated road load power setting shall take into account the dynamometer friction. The relationship between road load (absorbed) power and indicated road load power for a particular dynamometer shall be determined by the procedure outlined in § 86.118 or other suitable means.

(2) The road load power listed in the table above shall be used or the vehicle manufacturer may determine the road load power by an alternate procedure requested by the manufacturer and approved in advance by the Administrator.

(3) Where it is expected that more than 33 percent of a car line within an engine-system combination will be equipped with air conditioning per § 86.080-24(g)(2), the road load power listed above or as determined in paragraph (b)(2) of this section shall be increased by 10 percent, up to a maximum increase of 1.4 horsepower, for testing all test vehicles representing that car line within that engine-system combination if those vehicles are intended to be offered with air conditioning in production. The above increase for air conditioning shall be added prior to rounding off as instructed by notes 2 and 3 of the table.

(c) *Power absorption unit adjustment—light-duty vehicles.* (1) The power absorption unit shall be adjusted to reproduce road load power at 50 mph true speed. The dynamometer power absorption shall take into account the dynamometer friction, as discussed in § 86.118.

(2) The dynamometer road load setting is determined from the equivalent test weight, the reference frontal area, the body shape, the vehicle protuberances, and the tire type by the following equations.

(i) For light-duty vehicles to be tested on a twin roll dynamometer.

$$HP = aA + P + tW$$

Where:

Hp = the dynamometer power absorber setting at 50 mph (horsepower).

A = the vehicle reference frontal area (ft^2). The vehicle reference frontal area is defined as the area of the orthogonal projection of the vehicle; including tires and suspension components, but excluding vehicle protuberances, onto a plane perpendicular to both the longitudinal plane of the vehicle and the surface upon which the vehicle is positioned. Measurements of this area shall be computed to the nearest tenth of a square foot using a method approved in advance by the Administrator.

P = the protuberance power correction factor from table 1 of this paragraph (horsepower).

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W = vehicle equivalent test weight (lbs) from the table in paragraph (a).
a = 0.43 for fastback-shaped vehicles; = 0.50 for all other light duty vehicles.
t = 0.0 for vehicles equipped with radial ply tires; = $3 \cdot 10^{-1}$ for all other vehicles.

A vehicle is considered to have a fastback shape if the rearward projection of that portion of the rear surface (A_b) which slopes at an angle of less than 20 degrees from the horizontal is at least 25 percent as large as the vehicle reference frontal area. In addition, this surface must be smooth, continuous, and free from any local transitions greater than four degrees. An example of a fastback shape is presented in Figure 1.

Figure 1

TABLE I.—PROTUBERANCE POWER, P, VERSUS TOTAL PROTUBERANCE FRONTAL AREA, A_p

A_p (square foot)	P (horsepower)
$A_p < 0.30$	0.0
$0.30 \le A_p < 0.60$	.40
$0.60 \le A_p < 0.90$	.70
$0.90 \le A_p < 1.20$	1.00
$1.20 \le A_p < 1.50$	1.30
$1.50 \le A_p < 1.80$	1.60
$1.80 \le A_p < 2.10$	1.90
$2.10 \le A_p < 2.40$	2.20
$2.40 \le A_p < 2.70$	2.50
$2.70 \le A_p < 3.00$	2.80
$3.00 \le A_p$	3.10

The protuberance frontal area, A_p, is defined in a manner analogous to the definition of the vehicle reference frontal area, i.e., the total area of the orthogonal projections of the vehicle mirrors, hood ornaments, roof racks, and other protuberance onto a plane(s) perpendicular to both the longitudinal plane of the vehicle and the surface upon which the vehicle is positioned. A protuberance is defined as any fixture attached to the vehicle protruding more than 1 inch from the vehicle surface and having a projected area greater than 0.01 ft^2 with the area calculated by a method approved in advance by the Administrator. Included in the total protuberance frontal area shall be all fixtures which occur as standard equipment. The area of any optional equipment shall also be included if it is expected that more than 33 percent of the car line sold will be equipped with this option.

(ii) The dynamometer power absorber setting for light-duty vehicles shall be rounded to the nearest 0.1 horsepower.

(iii) For light-duty vehicles to be tested on a single, large roll dynamometer.

$$Hp = aA + P + (5.0 \times 10^{-4} + 0.33t)W$$

All symbols in the above equation are defined in paragraph (c)(2)(i) of this section. The rounding criteria of paragraph (c)(2)(i) also apply to this paragraph.

(3) The road load power calculated above shall be used or the vehicle manufacturer may determine the road load power by an alternate procedure requested by the manufacturer and approved in advance by the Administrator.

(4) Where it is expected that more than 33 percent of a car line within an engine-system combination will be equipped with air conditioning, per § 86.080-24(g)(2), the road load power as determined in paragraph (c) (2) or (3) of this section shall be increased by 10 percent up to a maximum incre-

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ment of 1.4 horsepower, for testing all test vehicles of that car line within that engine-system combination if those vehicles are intended to be offered with air conditioning in production. This power increment shall be added to the indicated dynamometer power absorption setting prior to rounding off this value.

[42 FR 45653, Sept. 12, 1977, as amended at 43 FR 52921, Nov. 14, 1978]

§ 86.130-78 Test sequence; general requirements.

The test sequence shown in figure B78-10 shows the steps encountered as the test vehicle undergoes the procedures subsequently described to determine conformity with the standards set forth. Ambient temperature levels encountered by the test vehicle shall not be less than 68° F (20° C) nor more than 86° F (30° C). The temperatures monitored during testing must be representative of those experienced by the test vehicle. The vehicle shall be approximately level during all phases of the test sequence to prevent abnormal fuel distribution.

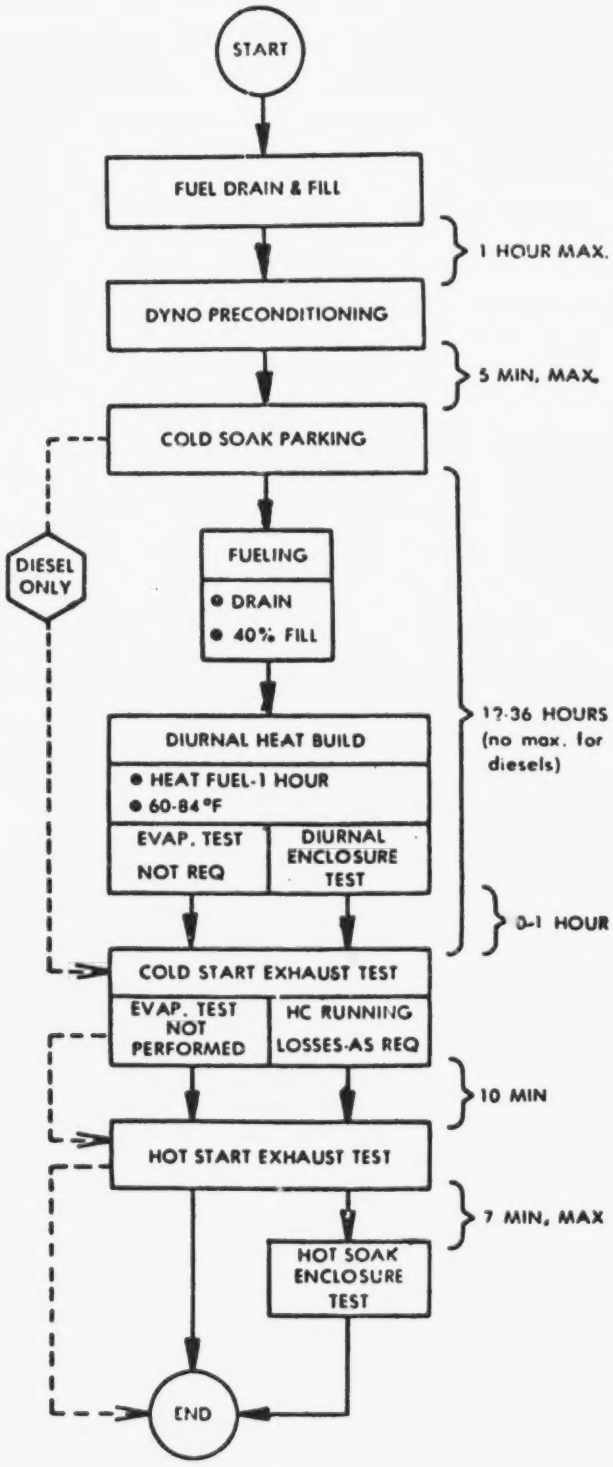

Figure E/8 10 TEST SEQUENCE

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§ 86.131-78 Vehicle preparation.

(a) For gasoline-fueled vehicles prepare the fuel tank(s) for recording the temperature of the prescribed test fuel at the approximate mid-volume of the fuel.

(b) Provide additional fittings and adapters, as required, to accommodate a fuel drain at the lowest point possible in the tank(s) as installed on the vehicle.

§ 86.132-78 Vehicle preconditioning.

(a) The vehicle shall be moved to the test area and the following operations performed:

(1) The fuel tank(s) shall be drained through the provided fuel tank(s) drain(s) and filled to the prescribed "tank fuel volume" with the specified test fuel, § 86.113. For the above operations the evaporative emission control system shall neither be abnormally purged nor abnormally loaded.

(2) Within one hour of being fueled the vehicle shall be placed, either by being driven or pushed, on a dynamometer and operated through one UDDS test procedure, see § 86.115 and Appendix I. A gasoline-fueled test vehicle may not be used to set dynamometer horsepower.

(3) For those unusual circumstances where additional preconditioning is desired by the manufacturer, such preconditioning may be allowed with the advance approval of the Administrator. The Administrator may also choose to conduct or require the conduct of additional preconditioning to insure that the evaporative emission control system is stabilized. The additional preconditioning shall consist of an initial one hour minimum soak and, one, two or three driving cycles of the UDDS, as described in paragraph (a)(2) of this section, each followed by a soak of at least one hour with engine off, engine compartment cover closed and cooling fan off. The vehicle may be driven off the dynamometer following each UDDS for the soak period.

(b) Within five minutes of completion of preconditioning the vehicle shall be driven off the dynamometer and parked. The vehicle shall be stored for not less than 12 hours nor for more than 36 hours (except Diesel vehicles which have no maximum time limitation) prior to the cold start exhaust test. (Gasoline-fueled vehicles undergo a one hour diurnal heat build prior to the cold start exhaust test. A wait of up to one hour is permitted between the end of the diurnal heat build and the beginning of the cold start exhaust test. See § 86.130 and Figure B78-10.)

(c) Vehicles to be tested for evaporative emissions shall be processed in accordance with procedures in §§ 86.133 through 86.138. Vehicles to be tested for exhaust emissions only shall be processed according to §§ 86.133 through 86.137.

§ 86.132-82 Vehicle preconditioning.

(a) The vehicle shall be moved to the test area and the following operations performed:

(1) The fuel tank(s) shall be drained through the provided fuel tank(s) drain(s) and filled to the prescribed "tank fuel volume" with the specified test fuel, § 86.113. For the above operations the evaporative emission control system shall neither be abnormally purged nor abnormally loaded.

(2) Within one hour of being fueled the vehicle shall be placed, either by being driven or pushed, on a dynamometer and operated through one Urban Dynamometer Driving Schedule test procedure, see § 86.115 and Appendix I. A test vehicle may not be used to set dynamometer horsepower.

(3) For those unusual circumstances where additional preconditioning is desired by the manufacturer, such preconditioning may be allowed with the advance approval of the Administrator. The Administrator may also choose to conduct or require the conduct of additional preconditioning to insure that the evaporative emission control system is stabilized in the case of gasoline engines, or to insure that the exhaust system is stabilized in the case of diesel engines. The additional preconditioning shall consist of an initial one hour minimum soak and, one, two, or three driving cycles of the UDDS, as described in paragraph (a)(2) of this section, each followed by a soak of at least one hour with engine off, engine compartment cover closed and cooling fan off. The vehicle may

be driven off the dynamometer following each UDDS for the soak period.

(b) Within five minutes of completion of preconditioning, the vehicle shall be driven off the dynamometer and parked. The vehicle shall be stored for not less than 12 hours nor for more than 36 hours prior to the cold start exhaust test. (Gasoline-fueled vehicles undergo a one-hour diurnal heat build prior to the cold start exhaust test. A wait of up to one hour is permitted between the end of the diurnal heat build and the beginning of the cold start exhaust test. See § 86.130 and Figure B79-5.)

(c) Vehicles to be tested for evaporative emissions shall be processed in accordance with procedures in §§ 86.133 through 86.138. Vehicles to be tested for exhaust emissions only shall be processed according to §§ 86.133 through 86.137.

[45 FR 14516, Mar. 5, 1980]

§ 86.133–78 Diurnal breathing loss test.

(a)(1) Following vehicle preparation and vehicle preconditioning procedures described in §§ 86.131 and 86.132 the test vehicle shall be allowed to soak for a period of not less than 12 or more than 36 hours prior to the exhaust emission test. The diurnal test shall start not less than 10 or more than 35 hours after the end of the preconditioning procedure. The start of the exhaust test shall follow the end of the diurnal test within one hour.

(2) Gasoline-fueled vehicles to be tested for exhaust emissions only shall undergo the diurnal heat build. Since no evaporative measurements are necessary, an evaporative enclosure is not required.

(b) The evaporative emission enclosure shall be purged for several minutes immediately prior to the test.

NOTE: If at anytime the hydrocarbon concentration exceeds 15,000 ppm C the enclosure should be immediately purged. This concentration provides a 4:1 safety factor against the lean flammability limit.

(c) The FID hydrocarbon analyzer shall be zeroed and spanned immediately prior to the test.

(d) If not already on, the evaporative enclosure mixing fan shall be turned on at this time.

(e) Immediately prior to the diurnal breathing loss test, the fuel tank(s) of the prepared vehicle shall be drained and recharged with the specified test fuel, § 86.113, to the prescribed "tank fuel volume," defined in § 86.078–2. The temperature of the fuel prior to its delivery to the fuel tank shall be between 50 and 60° F (10 and 16° C). The fuel tank cap(s) is not installed until the diurnal heat build begins.

(f) The test vehicle, with the engine shut off, shall be moved into the evaporative emission enclosure, the test vehicle windows and luggage compartments shall be opened, the fuel tank temperature sensor shall be connected to the temperature recording system, and, if required, the heat source shall be properly positioned with respect to the fuel tank(s) and/or connected to the temperature controller.

(g) The temperature recording system shall be started.

(h) The fuel may be artificially heated to the starting diurnal temperature.

(i) When the fuel temperature recording system reaches at least 58° F (14° C), immediately:

(1) Install fuel tank cap(s).

(2) Turn off purge blowers, if not already off at this time.

(3) Close and seal enclosure doors.

(j) When the fuel temperature recording system reaches 60±2° F (16±1.1° C), immediately:

(1) Analyze enclosure atmosphere for hydrocarbons and record. This is the initial (time=0 minutes) hydrocarbon concentration, C_{hci}, § 86.143.

(2) Start diurnal heat build and record time. This commences the 60±2 minute test period.

(k) The fuel shall be heated in such a way that its temperature change conforms to the following function to within ±3° F (±1.6° C):

$$F = T_o + 0.4t$$

for SI units,

$$C = T_o + (2/9)t$$

where:

F = fuel temperature, °F
C = fuel temperature, °C
t = time since beginning of test, minutes.
T_o = initial temperature.

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After 60±2 minutes of heating, the fuel temperature rise shall be 24±1° F (4° C (±0.5° C)).

(l) The FID hydrocarbon analyzer shall be zeroed and spanned immediately prior to the end of the diurnal test.

(m) The end of the diurnal breathing loss test occurs 60±2 minutes after the heat build begins, paragraph (j)(2). Analyze the enclosure atmosphere for hydrocarbons and record. This is the final (time=60 minutes) hydrocarbon concentration, C_{HCF} § 86.143. The time (or elapsed time) of this analysis shall be recorded.

(n) The heat source shall be turned off and the enclosure doors unsealed and opened.

(o) The heat source shall be moved away from the vehicle, if required, and/or disconnected from the temperature controller, the fuel tank temperature sensor shall be disconnected from the temperature recording system, the test vehicle windows and luggage compartments may be closed and the test vehicle, with the engine shut off, shall be removed from the evaporative emission enclosure.

(p) For vehicles with multiple tanks, the largest tank shall be designated as the primary tank and shall be heated in accordance with the procedures described in paragraph (k) of this section. All other tanks shall be designated as auxiliary tanks and shall undergo a similar heat build such that the fuel temperature shall be within 3° F (1.6° C) of the primary tank.

§ 86.134-78 Running loss test.

(a) If an engineering analysis or vehicle inspection indicates the possibility of evaporative emissions during vehicle operation, evaporative emission running loss measurements shall be made during the cold transient and stabilized portion of the exhaust emission test. Since running loss measurements cannot be made in the enclosure, the equipment described in § 86.177-17 shall be used to collect these emissions.

(1) The procedure in § 86.135 shall be followed.

(2) Prior to the initiation of the cold start exhaust emission test, the vapor loss measurement system shall be connected to all suspected sources of running loss evaporative emissions.

(3) The cold start transient and stabilized exhaust emission test portions shall be conducted according to the procedures of § 86.135 through § 86.137.

(4) Within one minute after the end of the stabilized exhaust emission test, the vapor loss measurement system shall be disconnected from the vehicle and the inlets and outlets sealed.

(5) Within one hour from the end of the running loss measurement, weight the vapor collection traps.

§ 86.135-79 Dynamometer procedure.

(a) The dynamometer run consists of two tests, a "cold" start test after a minimum 12-hour and a maximum 36-hour soak according to the provisions of §§ 86.132 and 86.133 and a "hot" start test following the "cold" start test by 10 minutes. Engine startup (with all accessories turned off), operation over the driving schedule, and engine shutdown make a complete cold start test. Engine startup and operation over the first 505 seconds of the driving schedule complete the hot start test. The exhaust emissions are diluted with ambient air and a continuously proportional sample is collected for analysis during each phase. The composite samples collected in bags are analyzed for hydrocarbons (except diesel hydrocarbons which are analyzed continuously), carbon monoxide, carbon dioxide, and oxides of nitrogen. A parallel sample of the dilution air is similarly analyzed for hydrocarbon, carbon monoxide, carbon dioxide, and oxides of nitrogen.

(b) During dynamometer operation, a fixed speed cooling fan shall be positioned so as to direct cooling air to the vehicle in an appropriate manner with the engine compartment cover open. In the case of vehicles with front engine compartments, the fan shall be squarely positioned within 12 inches of the vehicle. In the case of vehicles with rear engine compartments (or if special designs make the above impractical), the cooling fan shall be placed in a position to provide sufficient air to maintain vehicle cooling. The fan capacity shall normally not

exceed 5,300 cfm (2.50 m^3/s). If, however, the manufacturer can show that during field operation the vehicle receives additional cooling, and that such additional cooling is needed to provide a representative test, the fan capacity may be increased or additional fans used if approved in advance by the Administrator.

(c) The vehicle speed as measured from the dynamometer rolls shall be used. A speed vs. time recording, as evidence of dynamometer test validity, shall be supplied on request of the Administrator.

(d) Practice runs over the prescribed driving schedule may be performed at test points, provided an emission sample is not taken, for the purpose of finding the minimum throttle action to maintain the proper speed-time relationship, or to permit sampling system adjustments.

NOTE: When using two-roll dynamometers a truer speed-time trace may be obtained by minimizing the rocking of the vehicle in the rolls. The rocking of the vehicle changes the tire rolling radius on each roll. This rocking may be minimized by restraining the vehicle horizontally (or nearly so) by using a cable and winch.

(e) The drive wheel tires may be inflated up to a gauge pressure of 45 psi (310 kPa) in order to prevent tire damage. The drive wheel tire pressure shall be reported with the test results.

(f) If the dynamometer has not been operated during the 2-hour period immediately preceding the test it shall be warmed up for 15 minutes by operating at 30 mph (48 km/h) using a non-test vehicle or as recommended by the dynamometer manufacturer.

(g) If the dynamometer horsepower must be adjusted manually, it shall be set within 1 hour prior to the exhaust emissions test phase. The test vehicle shall not be used to make the adjustment. Dynamometers using automatic control of preselectable power settings may be set anytime prior to the beginning of the emissions test.

(h) The driving distance as measured by counting the number of dynamometer roll or shaft revolutions, shall be determined for the transient cold start, stabilized cold start, and transient hot start phases of the test. The revolutions shall be measured on the same roll or shaft used for measuring the vehicle's speed.

(i) Four wheel drive vehicles will be tested in a two wheel drive mode of operation. Full time four wheel drive vehicles will have one set of drive wheels temporarily disengaged by the vehicle manufacturer. Four wheel drive vehicles which can be manually shifted to a two wheel drive mode will be tested in the normal on-highway two wheel drive mode of operation.

§ 86.135-82 Dynamometer procedure.

(a) *Overview*—(1) *Gasoline-fueled vehicles.* The dynamometer run consists of two tests, a "cold" start test after a minimum 12-hour and a maximum 36 hour soak according to the provisions of §§ 86.132 and 86.133, and a "hot" start test following the "cold" start test by 10 minutes. Engine startup (with all accessories turned off), operation over the UDDS and engine shutdown make a complete cold start test. Engine startup and operation over the first 505 seconds of the driving schedule complete the hot start test. The exhaust emissions are diluted with ambient air and a continuously proportional sample is collected for analysis during each phase. The composite samples collected in bags are analyzed for hydrocarbon, carbon monoxide, carbon dioxide, and oxides of nitrogen. A parallel sample of the dilution air is similarly analyzed for hydrocarbon, carbon monoxide, carbon dioxide, and oxides of nitrogen.

(2) *Diesel vehicles.* The dynamometer run consists of two tests, a "cold" start test after a minimum 12 hours soak and a maximum 36 hour soak according to the provisions of §§ 86.132 and 86.133, and a "hot" start test following the "cold" start by 10 minutes. Engine startup (with all accessories turned off), operation over the UDDS and engine shutdown make a complete cold start test. Engine startup and operation over the first 505 seconds of the driving schedule complete the hot start test. The exhaust emissions are diluted with ambient air in the dilution tunnel as shown in Figure B82-3 (and Figure B82-4). Six particulate samples are collected on filters for weighing; the first sample

plus back-up is collected during the first 505 seconds of the cold start test; the second sample plus back-up is collected during the remainder of the cold start test (including shutdown); the third sample plus back-up is collected during the hot start test. Continuous proportional samples of gaseous emissions are collected for analysis during each test phase. The composite samples collected in bags are analyzed for carbon monoxide, carbon dioxide, and oxides of nitrogen. Hydrocarbons are sampled and analyzed continuously according to the provisions of § 86.110. Parallel samples of the dilution air are similarly analyzed for hydrocarbon, carbon monoxide, carbon dioxide, and oxides of nitrogen.

(b) During dynamometer operation, a fixed speed cooling fan shall be positioned so as to direct cooling air to the vehicle in an appropriate manner with the engine compartment cover open. In the case of vehicles with front engine compartments, the fan shall be squarely positioned within 12 inches (30.5 centimeters) of the vehicle. In the case vehicles with rear engine compartments (or if special designs make the above impractical), the cooling fan shall be placed in a position to provide sufficient air to maintain vehicle cooling. The fan capacity shall normally not exceed 5300 cfm (2.50 cubic meters per second). If, however, the manufacturer can show that during field operation the vehicle receives additional cooling, and that such additional cooling is needed to provide a representative test, the fan capacity may be increased or additional fans used if approved in advance by the Administrator.

(c) The vehicle speed as measured from the dynamometer rolls shall be used. A speed vs. time recording, as evidence of dynamometer test validity, shall be supplied on request of the Administrator.

(d) Practice runs over the prescribed driving schedule may be performed at test point, provided an emission sample is not taken, for the purpose of finding the minimum throttle action to maintain the proper speed-time relationship, or to permit sampling system adjustment.

NOTE: When using two-roll dynamometers a truer speed-time trace may be obtained by minimizing the rocking of the vehicle in the rolls; the rocking of the vehicle changes the tire rolling radius on each roll. This rocking may be minimized by restraining the vehicle horizontally (or nearly so) by using a cable and winch.

(e) The drive wheel tires may be inflated up to a gauge pressure of 45 psi (310 kPa) in order to prevent tire damage. The drive wheel tire pressure shall be reported with the test results.

(f) If the dynamometer has not been operated during the 2 hour period immediately preceding the test it shall be warmed up for 15 minutes by operating at 30 mph (48 kph) using a non-test vehicle or as recommended by the dynamometer manufacturer.

(g) If the dynamometer horsepower must be adjusted manually, it shall be set within 1 hour prior to the exhaust emissions test phase. The test vehicle shall not be used to make this adjustment. Dynamometers using automatic control of preselectable power settings may be set anytime prior to the beginning of the emissions test.

(h) The driving distance as measured by counting the number of dynamometer roll or shaft revolutions, shall be determined for the transient cold start, stabilized cold start, and transient hot start phases of the test. The revolutions shall be measured on the same roll or shaft used for measuring the vehicle's speed.

[45 FR 14517, Mar. 5, 1980]

§ 86.136-78 Engine starting and restarting.

(a) *Gasoline-fueled vehicles.* This paragraph (a) applies to gasoline-fueled vehicles.

(1) The engine shall be started according to the manufacturer's recommended starting procedures in the owner's manual. The initial 20-second idle period shall begin when the engine starts.

(2) Choke operation: (i) Vehicles equipped with automatic chokes shall be operated according to the manufacturer's operating instructions in the owner's manual, including choke setting and "kick-down" from cold fast idle.

(ii) Vehicles equipped with manual chokes shall be operated according to the manufacturer's operating instructions in the owner's manual.

(3) The transmission shall be placed in gear 15 seconds after the engine is started. If necessary, braking may be employed to keep the drive wheels from turning.

(4) The operator may use the choke, accelerator pedal, etc. where necessary to keep the engine running.

(5) If the manufacturer's operating instructions in the owner's manual do not specify a warm engine starting procedure, the engine (automatic- and manual-choke engines) shall be started by depressing the accelerator pedal about half way and cranking the engine until it starts.

(b) *Diesel vehicles.* The engine shall be started according to the manufacturer's recommended starting procedures in the owner's manual. The initial 20-second idle period shall begin when the engine starts. The transmission shall be placed in gear 15 seconds after the engine is started. If necessary, braking may be employed to keep the drive wheels from turning.

(c) If the vehile does not start after 10 seconds of cranking, cranking shall cease and the reason for failure to start shall be determined. The gas flow measuring device (or revolution counter) on the constant volume sampler (and the hydrocarbon integrator when testing diesel vehicles, see § 85.135 Dynamometer Test Runs) shall be turned off and the sample selector valves placed in the "standby" position during this diagnostic period. In addition, either the CVS should be turned off or the exhaust tube disconnected from the tailpipe during the diagnostic period. If failure to start is an operational error, the vehicle shall be rescheduled for testing from a cold start.

(1) If a failure to start occurs during the cold portion of the test and is caused by a vehicle malfunction corrective action of less than 30 minutes duration may be taken (according to § 86.078-25), and the test continued. The sampling system shall be reactivated at the same time cranking begins. When the engine starts, the driving schedule timing sequence shall begin. If failure to start is caused by vehicle malfunction and the vehicle cannot be started, the test shall be voided. The vehicle removed from the dynamometer, and corrective action may be taken according to § 86.078-25. The reasons for the malfunction (if determined) and the corrective action taken shall be reported.

(2) If a failure to start occurs during the hot start portion of the test and is caused by vehicle malfunction, the vehicle must be started within 1 minute of key on. The sampling system shall be reactivateted at the same time cranking begins. When the engine starts, the driving schedule timing sequence shall begin. If the vehicle cannot be started within 1 minute of key on, the test shall be voided, the vehicle removed from the dynamometer, corrective action taken, (according to § 86.078-25), and the vehicle rescheduled for testing. The reason for the malfunction (if determined) and the corrective action taken shall be reported.

(d) If the engine "false starts," the operator shall repeat the recommended starting procedure (such as resetting the choke, etc.).

(e) *Stalling:* (1) If the engine stalls during an idle period, the engine shall be restarted immediately and the test continued. If the engine cannot be started soon enough to allow the vehicle to follow the next acceleration as prescribed, the driving schedule indicator shall be stopped. When the vehicle restarts, the driving schedule indicator shall be reactivated.

(2) If the engine stalls during some operating mode other than idle, the driving schedule indicator shall be stopped, the vehicle shall then be restarted and accelerated to the speed required at that point in the driving schedule and the test continued. During acceleration to this point, shifting shall be performed in accordance with § 86.128.

(3) If the vehicle will not restart within one minute, the test shall be voided, the vehicle removed from the dynamometer, corrective action taken, and the vehicle rescheduled for test. The reason for the malfunction (if determined) and the corrective action

taken shall be reported to the Administrator.

[42 FR 32954, June 28, 1977, as amended at 42 FR 45654, Sept. 12, 1977; 43 FR 52921, Nov. 14, 1978]

§ 86.136-82 Engine starting and restarting.

(a) *Gasoline-fueled vehicles.* This paragraph (a) applies to gasoline-fueled vehicles.

(1) The engine shall be started according to the manufacturer's recommended starting procedures in the owner's manual. The initial 20-second idle period shall begin when the engine starts.

(2) Choke operation: (i) Vehicles equipped with automatic chokes shall be operated according to the manufacturer's operating instructions in the owner's manual, including choke setting and "kick-down" from cold fast idle.

(ii) Vehicles equipped with manual chokes shall be operated according to the manufacturer's operating instructions in the owner's manual.

(3) The transmission shall be placed in gear 15 seconds after the engine is started. If necessary, braking may be employed to keep the drive wheels from turning.

(4) The operator may use the choke, accelerator pedal, etc., where necessary to keep the engine running.

(5) If the manufacturer's operating instructions in the owner's manual do not specify a warm engine starting procedure, the engine (automatic- and manual-choke engines) shall be started by depressing the accelerator pedal about half way and cranking the engine until it starts.

(b) *Diesel vehicles.* The engine shall be started according to the manufacturer's recommended starting procedures in the owner's manual. The initial 20-second idle period shall begin when the engine starts. The transmission shall be placed in gear 15 seconds after the engine is started. If necessary, braking may be employed to keep the drive wheels from turning.

(c) If the vehicle does not start after 10 seconds of cranking, cranking shall cease and the reason for failure to start shall be determined. The gas flow measuring device on the constant volume sampler (usually a revolution counter) or CFV (and the hydrocarbon integrator and particulate sampling system when testing diesel vehicles, see § 85.135 Dynamometer test runs) shall be turned off and the sampler selector valves placed in the "standby" position during this diagnostic period. In addition, either the CVS should be turned off, or the exhaust tube disconnected from the tailpipe during the diagnostic period. If failure to start is an operational error, the vehicle shall be rescheduled for testing from a cold start.

(1) If a failure to start occurs during the cold portion of the test and is caused by a vehicle malfunction, corrective action of less than 30 minutes duration may be taken (according to § 86.078-25), and the test continued. All sampling system(s) shall be reactivated at the same time cranking begins. When the engine starts, the driving schedule timing sequence shall begin. If failure to start is caused by vehicle malfunction and the vehicle cannot be started, the test shall be voided, the vehicle removed from the dynamometer, and corrective action may be taken according to § 86.078-25. The reason for the malfunction (if determined) and the corrective action taken shall be reported to the Administrator.

(2) If a failure to start occurs during the hot start portion of the test and is caused by vehicle malfunction, the vehicle must be started within one minute of key on. All sampling system(s) shall be reactivated at the same time cranking begins. When the engine starts, the driving schedule timing sequence shall begin. If the vehicle cannot be started within one minute of key on, the test shall be voided, the vehicle removed from the dynamometer, corrective action taken (according to § 86.078-25), and the vehicle rescheduled for testing. The reason for the malfunction (if determined) and the corrective action taken shall be reported to the Administrator.

(d) If the engine "false starts" the operator shall repeat the recommended starting procedure (such as resetting the choke, etc.).

(e) *Stalling:* (1) If the engine stalls during an idle period, the engine shall be restarted immediately and the test

continued. If the engine cannot be started soon enough to allow the vehicle to follow the next acceleration as prescribed, the driving schedule indicator shall be stopped. When the vehicle restarts, the driving schedule indicator shall be reactivated.

(2) If the engine stalls during some operating mode other than idle, the driving schedule indicator shall be stopped, the vehicle shall then be restarted and accelerated to the speed required at that point in the driving schedule and the test continued. During acceleration to this point, shifting shall be performed in accordance with § 86.128.

(3) If the vehicle will not restart within one minute, the test shall be voided, the vehicle removed from the dynamometer, corrective action taken, and the vehicle rescheduled for test. The reason for the malfunction (if determined) and the corrective action taken shall be reported to the Administrator.

[45 FR 14517, Mar. 5, 1980]

§ 86.137-78 Dynamometer test runs.

(a) The vehicle shall be allowed to stand with the engine turned off for a period of not less than 12 hours or more than 36 hours before the cold start exhaust emission test. The cold start exhaust test shall follow the diurnal breathing loss test by not more than one hour. The vehicle shall be stored prior to the emission test in such a manner that precipitation (e.g., rain or dew) does not occur on the vehicle. The complete dynamometer test consists of a cold start drive of 7.5 miles (12.1 km) and simulates a hot start drive of 7.5 miles (12.1 km). The vehicle is allowed to stand on the dynamometer during the 10-minute time period between the cold and hot start tests. The cold start test is divided into two periods. The first period, representing the cold start "transient" phase, terminates at the end of the deceleration which is scheduled to occur at 505 seconds of the driving schedule. The second period, representing the "stabilized" phase, consists of the remainder of the driving schedule including engine shutdown. The hot start test similarly consists of two periods. The period, representing the hot start "transient" phase, terminates at the same point in the driving schedule as the first period of the cold start test. The second period of the hot start test, "stabilized" phase, is assumed to be identical to the second period of the cold start test. Therefore, the hot start test terminates after the first period (505 seconds) is run.

(b) The following steps shall be taken for each test:

(1) Place drive wheels of vehicle on dynamometer without starting engine. Reset and enable the roll revolution counter.

(2) Open the vehicle engine compartment cover and position the cooling fan.

(3) With the sample selector valves in the "standby" position, connect evacuated sample collection bags to the dilute exhaust and dilution air sample collection systems.

(4) Start the CVS (if not already on), the sample pumps, the temperature recorder, the vehicle cooling fan and the heated hydrocarbon analysis recorder (Diesel only). (The heat exchanger of the constant volume sampler, if used, Diesel hydrocarbon analyzer continuous sample line and filter (if applicable) should be preheated to their respective operating temperatures before the test begins.)

(5) Adjust the sample flow rates to the desired flow rate (minimum of 10 cfh, 0.28 m^3/hr) and set the gas flow measuring devices to zero.

NOTE: CFV-CVS sample flowrate is fixed by the venturi design.

(6) Attach the flexible exhaust tube to the vehicle tailpipe(s).

(7) Start the gas flow measuring device, position the sample selector valves to direct the sample flow into the "transient" exhaust sample bag and the "transient" dilution air sample bag (turn on the diesel hydrocarbon analyzer system integrator and mark the recorder chart, if applicable), turn the key on, and start cranking the engine.

(8) Fifteen seconds after the engine starts, place the transmission in gear.

(9) Twenty seconds after the engine starts, begin the initial vehicle acceleration of the driving schedule.

(10) Operate the vehicle according to the dynamometer driving schedule (§ 86.115).

(11) At the end of the deceleration which is scheduled to occur at 505 seconds, simultaneously switch the sample flows from the "transient" bags to the "stabilized" bags, switch off gas flow measuring device No. 1 (and the Diesel hydrocarbon integrator No. 1, mark the Diesel hydrocarbon recorder chart) and start gas flow measuring device No. 2 (and Diesel hydrocarbon integrator No. 2). Before the acceleration which is scheduled to occur at 510 seconds, record the measured roll or shaft revolutions and reset the counter or switch to a second counter. As soon as possible transfer the "transient" exhaust and dilution air samples to the analytical system and process the samples according to § 86.140 obtaining a stabilized reading of the exhaust sample on all analyzers within 20 minutes of the end of the sample collection phase of the test.

(12) Turn the engine off 2 seconds after the end of the last deceleration (at 1,369 seconds).

(13) Five seconds after the engine stops running, simultaneously turn off gas flow measuring device No. 2 (and the Diesel hydrocarbon integrator No. 2, mark the hydrocarbon recorder chart, if applicable) and position the sample selector valves to the "standby" position. Record the measured roll or shaft revolutions and reset the counter. As soon as possible transfer the "stabilized" exhaust and dilution air samples to the analytical system and process the samples according to § 86.140 obtaining a stabilized reading of the exhaust sample on all analyzers within 20 minutes of the end of the sample collection phase of the test.

(14) Immediately after the end of the sample period turn off the cooling fan and close the engine compartment cover.

(15) Turn off the CVS or disconnect the exhaust tube from the tailpipe of the vehicle.

(16) Repeat the steps in paragraph (b)(2) through (10) of this section for the hot-start test, except only one evacuated sample bag is required for sampling exhaust gas and one for dilution air. The key-on operation step described in paragraph (b)(7) of this section shall begin between 9 and 11 minutes after the end of the sample period for the cold-start test.

(17) At the end of the deceleration which is scheduled to occur at 505 seconds, simultaneously turn off gas flow measuring device No. 1 (and Diesel hydrocarbon integrator No. 1, mark the Diesel hydrocarbon recorder chart, if applicable) and position the sample selector valve to the "standby" position. (Engine shutdown is not part of the hot start test sample period.) Record the measured roll or shaft revolutions.

(18) As soon as possible transfer the hot start "transient" exhaust and dilution air samples to the analytical system and process the samples according to § 86.140 obtaining a stabilized reading of the exhaust sample on all analyzers within 20 minutes of the end of the sample collection phase of the test.

(19) Disconnect the exhaust tube from the vehicle tailpipe(s) and drive vehicle from dynamometer.

(20) The CVS may be turned off, if desired.

(21) Vehicles to be tested for evaporative emissions will proceed according to § 86.138. For all others this completes the test sequence.

[42 FR 32954, June 28, 1977, as amended at 42 FR 45655, Sept. 12, 1977]

§ 86.137-82 Dynamometer test run, gaseous and particulate emissions.

(a) *General*—(1) *Gasoline-fueled vehicles.* The vehicle shall be allowed to stand with the engine turned off for a period of not less than 12 hours or more than 36 hours before the cold start exhaust emission test. The cold start exhaust test shall follow the diurnal breathing loss test by not more than one hour. The vehicle shall be stored prior to the emission test in such a manner that precipitation (e.g., rain or dew) does not occur on the vehicle. The complete dynamometer test consists of a cold start drive of 7.5 miles (12.1 kilometers) and simulates a hot start drive of 7.5 miles (12.1 kilometers). The vehicle is allowed to stand on the dynamometer during the 10 minute time period between the cold and hot start tests. The cold start

test is divided into two periods. The first period, representing the cold start "transient" phase, terminates at the end of the deceleration which is scheduled to occur at 505 seconds of the driving schedule. The second period, representing the "stabilized" phase, consists of the remainder of the driving schedule including engine shutdown. The hot start test, similarly, consists of two periods. The first period, representing the hot start "transient" phase, terminates at the same point in driving schedule as the first period of the cold start test. The second period of the hot start test, "stabilized" phase, is assumed to be identical to the second period of the cold start test. Therefore, the hot start test terminates after the first period (505 seconds) is run.

(2) *Diesel vehicles.* The vehicle shall be allowed to stand with the engine turned off for a period of not less than 12 hours or more than 36 hours before the cold start exhaust emission test. The vehicle shall be stored prior to the emission test in such a manner that precipitation (e.g., rain or dew) does not occur on the vehicle. The complete dynamometer test consists of a cold start drive of 7.5 miles (12.1 km), and simulates a hot start drive of 7.5 miles (12.1 km). The vehicle is allowed to stand on the dynamometer during the 10 minute time period between the cold and hot start tests. The cold start test is divided into two periods. The first period, representing the cold start "transient" phase, terminates at the end of the deceleration which is scheduled to occur at 505 seconds of the driving schedule. The second period, representing the "stabilized" phase, consists of the remainder of the driving schedule including engine shutdown. The hot start test, similarly, consists of two periods. The first period, representing the start of the "transient" phase, terminates at the same point in the driving schedule as the first period of the cold start test. The second period of the hot start test, "stabilized" phase, is assumed to be identical to the second period of the cold start test. Therefore, the hot start test terminates after the first period (505 seconds) is run.

(b) The following steps shall be taken for each test:

(1) Place drive wheels of vehicle on dynamometer without starting engine.

(2) Open the vehicle engine compartment cover and position the cooling fan.

(3) With the sample selector valves in the "standby" position connect evacuated sample collection bags to the dilute exhaust and dilution air sample collection systems.

(4) Start the CVS (if not already on), the sample pumps (except the diesel particulate sample pump, if applicable), the temperature recorder, the vehicle cooling fan, and the heated hydrocarbon analysis recorder (diesels only). (The heat exchanger of the constant volume sampler, if used, diesel hydrocarbon analyzer continuous sample line and filter, if applicable, should be preheated to their respective operating temperatures before the test begins.)

(5) Adjust the sample flow rates to the desired flow rate and set the gas flow measuring devices to zero.

(i) For gaseous samples (except hydrocarbon samples), the minimum flow rate is 0.17 cfm (0.08 1/s).

(ii) For hydrocarbon samples, the minimum FID (or HFID in the case of diesels) flow rate is 0.067 cfm (0.031 1/sec).

NOTE: CFV sample flow rate is fixed by the venturi design.

(6) Attach the exhaust tube to the vehicle tailpipe(s).

(7) Carefully install a particulate sample filter into each of the filter holders for diesel tests. The filters must be handled only with forceps or tongs. Rough or abrasive filter handling will result in erroneous weight determination.

(8) Start the gas flow measuring device, position the sample selector valves to direct the sample flow into the "transient" exhaust sample bag and the "transient" dilution air sample bag (turn on the diesel hydrocarbon analyzer system integrator, mark the recorder chart, start particulate sample pump No. 1, and record both gas meter or flow measurement instrument readings, if applicable),

turn the key on, and start cranking the engine.

(9) Fifteen seconds after the engine starts, place the transmission in gear.

(10) Twenty seconds after the engine starts, begin the initial vehicle acceleration of the driving schedule.

(11) Operate the vehicle according to the Urban Dynamometer Driving Schedule (§ 86.115).

NOTE: During diesel testing, adjust the flow rate through the particulate sample probe to maintain a constant value within ±5 percent of the set flow rate. Record the average termperature and pressure at the gas meter or flow instrument inlet. If the set flow rate cannot be maintained because of high particulate loading on the filter, the test shall be terminated. The test shall be rerun using a lower flow rate, or larger diameter filter, or both.

(12) At the end of the deceleration which is scheduled to occur at 505 seconds, simultaneously switch the sample flows from the "transient" bags to the "stabilized" bags, switch off gas flow measuring device No. 1, (switch off the No. 1 diesel hydrocarbon integrator and the No. 1 particulate sample pump, mark the diesel hydrocarbon recorder chart, and close valves isolating particulate filter No. 1, if applicable) and start gas flow measuring device No. 2 (and start the diesel hydrocarbon integrator No. 2 and the No. 2 particulate sample pump and open valves isolating particulate filter No. 2, if applicable). Before the acceleration which is scheduled to occur at 510 seconds, record the measured roll or shaft revolutions and reset the counter or switch to a second counter. As soon as possible transfer the "transient" exhaust and dilution air samples to the analytical system and process the samples according to § 86.140 obtaining a stabilized reading of the exhaust sample on all analyzers within 20 minutes of the end of the sample collection phase of the test.

(13) Turn the engine off 2 seconds after the end of the last deceleration (at 1,369 seconds).

(14) Five seconds after the engine stops running, simultaneously turn off gas flow measuring device No. 2 (and the diesel hydrocarbon integrator No. 2, mark the hydrocarbon recorder chart, turn off the No. 2 particulate sample pump and close the valves isolating particulate filter No. 2, if applicable) and position the sample selector valves to the "standby" position (and open the valves isolating particulate filter No. 1, if applicable). Record the measured roll or shaft revolutions, (both gas meter or flow measurement instrumentation readings), and re-set the counter. As soon as possible, transfer the "stabilized" exhaust and dilution air samples to the analytical system and process the samples according to § 86.140, obtaining a stabilized reading of the exhaust sample on all analyzers within 20 minutes of the end of the sample collection phase of the test. (Carefully remove both pairs of particulate sample filters from their respective holders, and place each in a separate petri dish, and cover, if applicable.)

(15) Immediately after the end of the sample period, turn off the cooling fan and close the engine compartment cover.

(16) Turn off the CVS or disconnect the exhaust tube from the tailpipe(s) of the vehicle.

(17) Repeat the steps in paragraph (b)(2) through (b)(11) of this section for the hot start test, except only two evacuated sample bags (and only one pair of particulate sample filters if applicable) are required; one bag is for sampling exhaust gas and the other bag is for sampling dilution air. The step in paragraph (b)(8) of this section shall begin between 9 and 11 minutes after the end of the sample period for the cold start test.

(18) At the end of the deceleration which is scheduled to occur at 505 seconds, simultaneously turn off gas flow measuring device No. 1 (and the diesel hydrocarbon integrator No. 1, mark the diesel hydrocarbon recorder chart and turn off the No. 1 particulate sample pump, if applicable) and position the sample selector valve to the "standby" position. (Engine shutdown is not part of the hot start test sample period.) Record the measured roll or shaft revolutions (and the No. 1 gas meter reading or flow measurement instrument). (Carefully remove the third pair of particulate sample filters from its holder and place in a clean petri dish and cover, if applicable.)

(19) As soon as possible, transfer the hot start "transient" exhaust and dilution air samples to the analytical system and process the samples according to § 86.140 obtaining a stablized reading of the exhaust sample on all analyzers within 20 minutes of the end of the sample collection phase of the test.

(20) As soon as possible, and in no case longer than one hour after the end of the hot start phase of the test, transfer the six particulate filters to the weighing chamber for post-test conditioning, if applicable.

(21) Disconnect the exhaust tube from the vehicle tailpipe(s) and drive the vehicle from dynamometer.

(22) The CVS or CFV may be turned off, if desired.

(23) Vehicles to be tested for evaporative emissions will proceed according to § 86.138. For all others this completes the test sequence.

[45 FR 14518, Mar. 5, 1980]

§ 86.138-78 Hot-soak test.

The hot-soak evaporative emission test shall be conducted immediately following the hot transient exhaust emission test.

(a) Prior to the completion of the hot-start transient exhaust emission sampling period, the evaporative emission enclosure shall be purged for several minutes.

(b) The FID hydrocarbon analyzer shall be zeroed and spanned immediately prior to the test.

(c) If not already on, the evaporative enclosure mixing fan shall be turned on at this time.

(d) Upon completion of the hot transient exhaust emission sampling period, the vehicle engine compartment cover shall be closed, the cooling fan shall be moved, the vehicle shall be disconnected from the dynamometer and exhaust sampling system, and then driven at minimum throttle to the vehicle entrance of the enclosure.

(e) The vehicle's engine must be stopped before any part of the vehicle enters the enclosure. The vehicle may be pushed or coasted into the enclosure.

(f) The test vehicle windows and luggage compartments shall be opened, if not already open.

(g) The temperature recording system shall be started and the time of engine shut off shall be noted on the evaporative emission hydrocarbon data recording system.

(h) The enclosure doors shall be closed and sealed within two minutes of engine shutdown and within seven minutes after the end of the exhaust test.

(i) The 60 ± 0.5 minute hot soak begins when the enclosure doors are sealed. The enclosure atmosphere shall be analyzed and recorded. This is the initial (time=0 minutes) hydrocarbon concentration, C_{HCi}, for use in calculating evaporative losses, see § 86.143.

(j) The test vehicle shall be permitted to soak for a period of one hour in the enclosure.

(k) The FID hydrocarbon analyzer shall be zeroed and spanned immediately prior to the end of the test.

(l) At the end of the 60 ± 0.5 minute test period, again analyze the enclosure atmosphere and record time. This is the final (time=60 minutes) hydrocarbon concentration, C_{HCi}, for use in calculating evaporative losses, see § 86.143. This operation completes the evaporative emission measurement procedure.

§ 86.139-78 [Reserved]

§ 86.139-82 Diesel particulate filter handling and weighing.

(a) At least 8 hours, but not more than 56 hours before the test, place each filter in an open, but protected, petri dish and place in the weighing chamber which meets the humidity and temperature specifications of § 86.112.

(b) At the end of the 8 to 56 hour stabilization period, weigh the filter on a balance having a precision of one microgram. Record this weight. This reading is the tare weight.

(c) The filter shall then be stored in a covered petri dish which shall remain in the weighing chamber until needed for testing.

(d) If the filter is not used within one hour of its removal from the

weighing chamber, it shall be reweighed.

(e) After the test, and after the sample filter is returned to the weighing room, condition it for at least 1 hour but not more than 56 hours. Then weigh a second time. This latter reading is the gross weight of the filter. Record this weight.

(f) The net weight (Pe) is the gross weight minus the tare weight.

NOTE: Should the sample on the filter contact the petri dish or any other surface, the test is void and must be rerun.

[45 FR 14519, Mar. 5, 1980]

§ 86.140-78 Exhaust sample analysis.

The following sequence of operations shall be performed in conjunction with each series of measurements. The analyzer shall be "zeroed" and "spanned" for each range which is to be used for sample analysis.

(a) Zero the analyzers and obtain a stable zero reading. Recheck after tests.

(b) Introduce the span gases and set instrument gains. In order to avoid corrections, span and calibrate at the same flow rates used to analyze the test sample. Span gases shall have concentrations of at least 70 percent of full scale. If gain has shifted significantly on the analyzers, check the calibrations. Show actual concentrations on the chart.

(c) Check zeros; repeat the procedure in paragraphs (a) and (b) of this section if required.

(d) Check flowrates and pressures.

(e) Measure HC, CO, CO_2, and NO_x concentrations of samples.

(f) For Diesel vehicles, continuously record (integrate electronically if desired) dilute hydrocarbon emission levels during test. Background samples are collected in sample bags and analyzed as above.

(g) Check zero and span points. If difference is greater than 2 percent of full scale, repeat the procedure in paragraphs (a) through (f) of this section.

[42 FR 32954, June 28, 1977, as amended at 43 FR 52922, Nov. 14, 1978; 44 FR 16394, Mar. 19, 1979]

§ 86.140-82 Exhaust sample analysis.

The following sequence of operations shall be performed in conjunction with each series of measurement Y:

(a) For CO, CO_2, NO_x and gasoline HC:

(1) Zero the analyzers and obtain a stable zero reading. Recheck after tests.

(2) Introduce span gases and set instrument gains. In order to avoid errors, span and calibrate at the same flow rates used to analyze the test sample. Span gases should have concentrations equal to 75 to 100 percent of full scale. If gain has shifted significantly on the analyzers, check the calibrations. Show actual concentrations on chart.

(3) Check zeros; repeat the procedure in paragraphs (a) (1) and (2) of this section if required.

(4) Check flow rates and pressures.

(5) Measure HC, CO, CO_2 and NO_x concentrations of samples.

(6) Check zero and span points. If difference is greater than 2 percent of full scale, repeat the procedure in paragraphs (a) (1) through (5) of this section.

(b) For diesel HC:

(1) Zero HFID analyzer and obtain a stable zero reading.

(2) Introduce span gas and set instrument gains. Span gas should have concentration equal to 75 to 100 percent of full scale.

(3) Check zero as in paragraph (b)(1) of this section.

(4) Introduction of zero and span gas into the analyzer can be accomplished by either of the following methods:

(i) Close heated valve in HC sample (see Figures B82-3 or B82-4), and allow gases to enter HFID. Extreme care should be taken not to introduce gases under high pressure.

(ii) Connect zero and span line directly to HC sample probe and introduce gases at a flow rate between 190 percent and 210 percent of the HFID flow rate (see Figures B82-3A or B82-4A). Excess flow must be allowed to exit probe inlet.

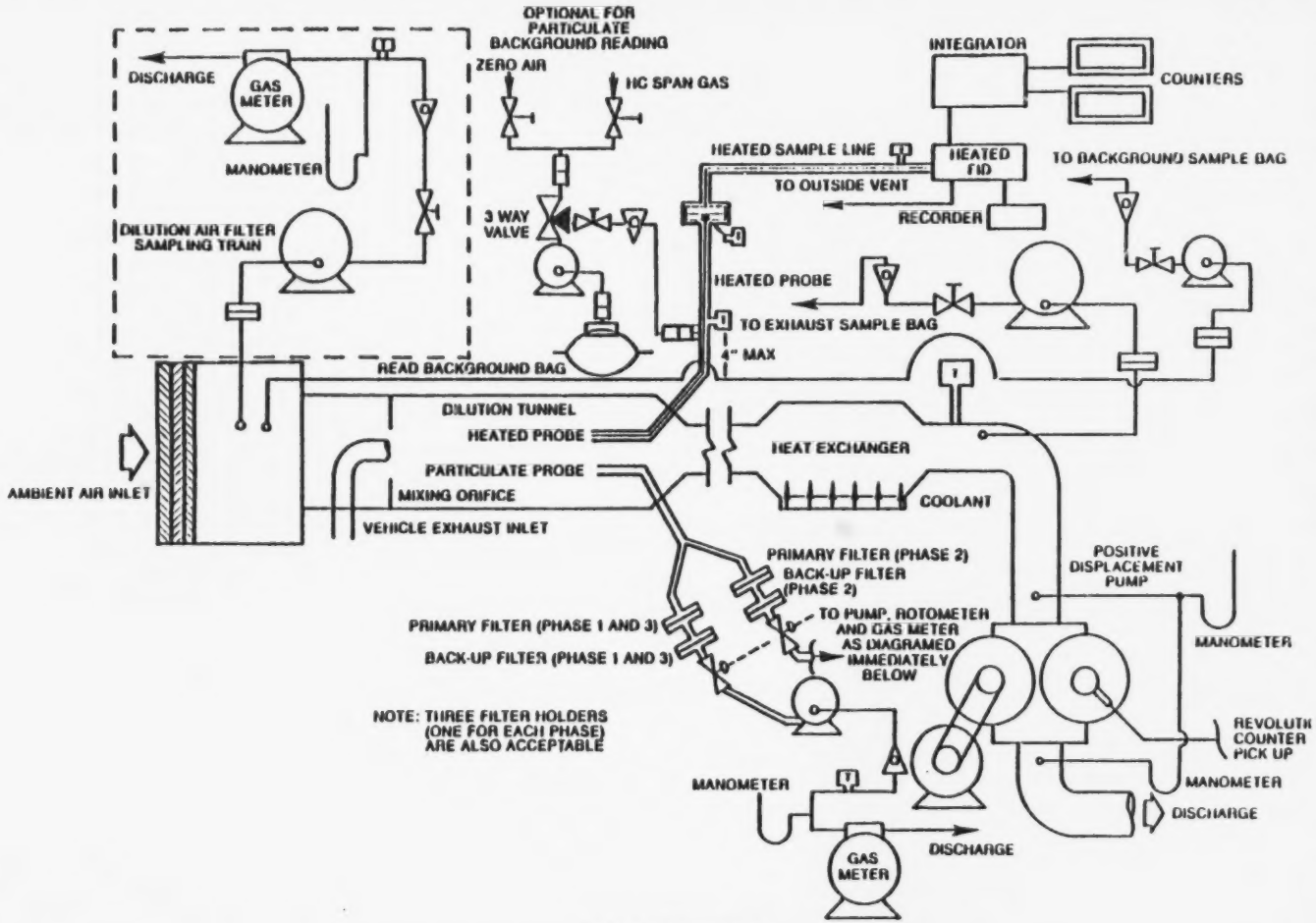

FIGURE B82-3A
GASEOUS AND PARTICULATE EMISSIONS SAMPLING SYSTEM (PDP-CVS)
(FOR DIESEL VEHICLES ONLY)

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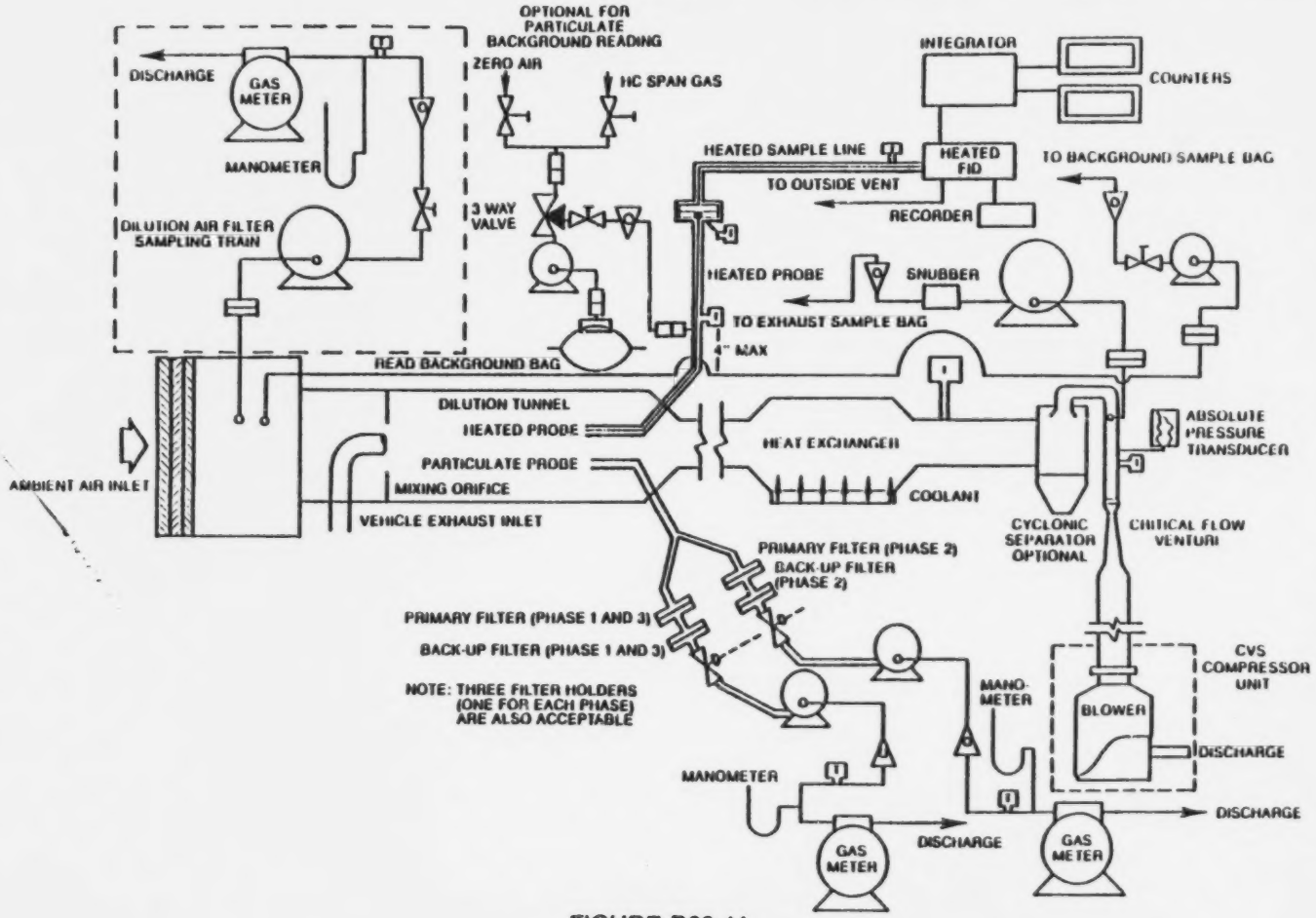

FIGURE B82-4A

GASEOUS AND PARTICULATE EMISSIONS SAMPLING SYSTEM (CFV-CVS)

(FOR DIESEL VEHICLES ONLY)

NOTE: In order to minimize errors, HFID flow rate and pressure during zero and span (and background bag reading) must be exactly the same as that used during testing.

(5) Continuously record (integrate electronically if desired) dilute hydrocarbon emissions levels during test. Background samples are collected in sample bags and analyzed as in paragraph (4)(i) or (4)(ii) of this section.

(6) Check zero and span as in paragraph (b)(1) through (b)(4)(i) or (4)(ii) of this section. If difference is greater than 2 percent of full scale, void test and check for HC "hangup" or electronic drift in analyzer.

[45 FR 14520, Mar. 5, 1980]

§ 86.141-78 [Reserved]

§ 86.142-80 Records required.

The following information shall be recorded with respect to each test:

(a) Test number.

(b) System or device tested (brief description).

(c) Date and time of day for each part of the test schedule.

(d) Instrument op erator.

(e) Driver or operator.

(f) Vehicle: ID number, Manufacturer, Model year, Standards, Engine family, Evaporative emissions family, Basic engine description (including displacement, number of cylinders, and catalyst usage), Fuel system (including number of carburetors, number of carburetor barrels, fuel injection type, and fuel tank(s) capacity and location), Engine code, Gross vehicle weight rating, Inertia weight class, Test weight, Actual curb weight at zero miles, Actual road load at 50 mph, Transmission configuration, Axle ratio, Car line, Odometer reading, Idle rpm, and Drive wheel tire pressure as applicable.

(g) Indicated road load power absorption at 50 mph (80 km/h) and dynamometer serial number. As an alternative to recording the dynamometer serial number, a reference to a vehicle test cell number may be used, with the advance approval of the Administrator, provided the test cell records show the pertinent information.

(h) All pertinent instrument information such as tuning—gain—serial number—detector number—range. As an alternative, a reference to a vehicle test cell number may be used, with the advance approval of the Administrator, provided test cells calibration records show the pertinent instrument information.

(i) Recorder charts: Identify zero, span, exhaust gas, and dilution air sample traces.

(j) Test cell barometric pressure, ambient temperature and humidity.

NOTE: A central laboratory barometer may be used: *Provided*, That individual test cell barometric pressures are shown to be within ±0.1 percent of the barometric pressure at the central barometer location.

(k) Fuel temperatures, as prescribed.

(l) Pressure of the mixture of exhaust and dilution air entering the CVS metering device, the pressure increase across the device, and the temperature at the inlet. The temperature may be recorded continuously or digitally to determine temperature variations.

(m) The number of revolutions of the positive displacement pump accumulated during each test phase while exhaust samples are being collected. The number of standard cubic feet metered by a critical flow venturi during each test phase would be the equivalent record for a CFV-CVS.

(n) The humidity of the dilution air.

NOTE: If conditioning columns are not used (see § 86.122 and § 86.144) this measurement can be deleted. If the conditioning columns are used and the dilution air is taken from the test cell, the ambient humidity can be used for this measurement.

(o) Temperature set point of the heated sample line and heated hydrocarbon detector temperature control system (for Diesel vehicles only).

(p) The driving distance for each of the three phases of the test, calculated from the measured roll of shaft revolutions.

[42 FR 45655, Sept. 12, 1977]

§ 86.142-82 Records required.

The following information shall be recorded with respect to each test:

(a) Test number.

(b) System or device tested (brief description).

(c) Date and time of day for each part of the test schedule.

(d) Instrument operated.

(e) Driver or operator.

(f) Vehicle: ID number, manufacturer, model year, standards, engine family, evaporative emissions family, basic engine description (including displacement, number of cylinders, turbocharger used, and catalyst usage), fuel system (including number of carburetors, number of carburetor barrels, fuel injection type and fuel tank(s) capacity and location), engine code, gross vehicle weight rating, inertia weight class, actual curb weight at zero miles, actual road load at 50 mph (80 kph), transmission configuration, rpm and drive wheel tire pressure, as applicable.

(g) Indicated road load power absorption at 50 mph (80 kph) and dynamometer serial number. As an alternative to recording the dynamometer serial number, a reference to a vehicle test cell number may be used, with the advance approval of the Administrator, provided the test cell records show the pertinent information.

(h) All pertinent instrument information such as tuning—gain—serial number—detector number—range. As an alternative a reference to a vehicle test cell number may be used, with the advance approval of the Administrator, provided test cell calibration records show the pertinent instrument information.

(i) Recorder charts: Identify zero, span, exhaust gas, and dilution air sample traces.

(j) Test cell barometric pressure, ambient temperature, and humidity.

NOTE: A central laboratory barometer may be used: *Provided*, That individual test cell barometric pressures are shown to be within ±0.1 percent of the barometric pressure at the central barometer location.

(k) Fuel temperatures, as prescribed.

(l) Pressure of the mixture of exhaust and dilution air entering the CVS metering device (or pressure drop across the CFV), the pressure increase across the device, and the temperature at the inlet. The temperature may be recorded continuously or digitally to determine temperature variations.

(m) The number of revolutions of the positive displacement pump accumulated during each test phase while exhaust samples are being collected. The number of standard cubic feet metered by a critical flow venturi during each test phase would be the equivalent record for a CFV.

(n) The humidity of the dilution air.

NOTE: If conditioning columns are not used (see §§ 86.122 and 86.144) this measurement can be deleted. If the conditioning columns are used and the dilution air is taken from the test cell, the ambient humidity can be used for this measurement.

(o) The temperature of the gas flowing in the heated sample line before the heated filter, and also before the HFID, and the temperature of the control system of the heated hydrocarbon detector (for diesel vehicles only).

(p) The driving distance for each of the three phases of the test, calculated from the measured roll or shaft revolutions.

(q) *Additional required records for diesel vehicles.* (1) Pressure and temperature of the dilute exhaust mixture (and background air if sampled) at the inlet to the gas meter used for particulate sampling.

(2) The temperature of the dilute exhaust mixture inside the dilution tunnel near the inlet of the particulate probe.

(3) Gas meter or flow measurement instrumentation readings at the start of each sample period and at the end of each sample period.

(4) The stabilized pre-test weight and post-test weight of each particulate sample and back-up filter.

(5) Continuous temperature and humidity recording of the ambient air in which the particulate filters were stabilized.

[45 FR 14523, Mar. 5, 1980]

§ 86.143-78 Calculations; evaporative emissions.

The calculation of the net hydrocarbon mass change in the enclosure is used to determine the diurnal and hot soak mass emissions. The mass is calculated from initial and final hydrocarbon concentrations in ppm carbon, initial and final enclosure ambient temperatures, initial and final baro-

metric pressures, and net enclosure volume using the following equation:

$$M_{HC} = kV_n \times 10^{-4}\left[\frac{C_{HCf}P_{Bf}}{T_f} - \frac{C_{HCi}P_{Bi}}{T_i}\right]$$

where:

M_{HC} = hydrocarbon mass, g.

C_{HC} = hydrocarbon concentration as ppm carbon.

V_n = net enclosure volume, ft³ (m³) as determined by subtracting 50 ft³ (1.42 m³) (volume of vehicle with trunk and windows open) from the enclosure volume. A manufacturer may use the measured volume of the vehicle (instead of the nominal 50 ft³) with advance approval by the Administrator: *Provided*, The measured volume is determined and used for all vehicles tested by that manufacturer.

P_B = barometric pressure, in. Hg (kPa).

T = enclosure ambient temperature, R (K).

k = .208 (12 + H/C)

for SI units,

$$k = 1.2\ (12 + H/C)$$

where:

H/C = Hydrogen-carbon ratio.

H/C = 2.33 for diurnal emissions.

H/C = 2.2 for hot soak emissions.

i = indicates initial reading.

f = indicates final reading.

The final reported results shall be computed by summing the individual evaporative emission results determined for the diurnal breathing-loss test, running-loss test, and the hot-soak test.

§ 86.144-78 Calculations; exhaust emissions.

The final reported test results shall be computed by use of the following formula:

(a) For light duty vehicles and light duty trucks:

$$Y_{wm} = 0.43\ ((Y_{ct} + Y_s)/(D_{ct} + D_s)) + 0.57\ ((Y_{ht} + Y_s)/(D_{ht} + D_s))$$

Where:

Y_{wm} = Weighted mass emissions of each pollutant, i.e., HC, CO, NO_x or CO_2, in grams per vehicle mile.

Y_{ct} = Mass emissions as calculated from the "transient" phase of the cold start test, in grams per test phase.

Y_{ht} = Mass emissions as calculated from the "transient" phase of the hot start test, in grams per test phase.

Y_s = Mass emissions as calculated from the "stabilized" phase of the cold start test, in grams per test phase.

D_{ct} = The measured driving distance from the "transient" phase of the cold start test, in miles.

D_{ht} = The measured distance from the "transient" phase of the hot start test, in miles.

D_s = The measured driving distance from the "stabilized" phase of the cold start test, in miles.

(b) The mass of each pollutant for each phase of both the cold start test and the hot start test is determined from the following:

(1) Hydrocarbon mass:

$$HC_{mass} = V_{mix} \times Density_{HC} \times (HC_{conc}/1{,}000{,}000)$$

(2) Oxides of nitrogen mass:

$$NOx_{mass} = V_{mix} \times Density_{NO2} \times K_H \times (NOx_{conc}/1{,}000{,}000)$$

(3) Carbon monoxide mass:

$$CO_{mass} = V_{mix} \times Density_{CO} \times (CO_{conc}/1{,}000{,}000)$$

(4) Carbon dioxide mass:

$$CO_{2mass} = V_{mix} \times Density_{CO2} \times (CO_{2conc}/100)$$

(c) Meaning of symbols:

(1) HC_{mass} = Hydrocarbon emissions, in grams per test phase.

$Density_{HC}$ = Density of hydrocarbons is 16.33 g/ft³ (0.5768 kg/m³), assuming an average carbon to hydrogen ratio of 1:1.85, at 68° F (20° C) and 760 mm Hg (101.3 kPa) pressure.

HC_{conc} = Hydrocarbon concentration of the dilute exhaust sample corrected for background, in ppm carbon equivalent, i.e., equivalent propane × 3.

$HC_{conc} = HC_e - HC_d(1\text{-}1/DF)$

Where:

HC_e = Hydrocarbon concentration of the dilute exhaust sample or, for Diesel, average hydrocarbon concentration of the dilute exhaust sample as calculated from the integrated HC traces, in ppm carbon equivalent.

HC_d = Hydrocarbon concentration of the dilution air as measured, in ppm carbon equivalent.

(2) NOx_{mass} = Oxides of nitrogen emissions, in grams per test phase.

$Density_{NO2}$ = Density of oxides of nitrogen is 54.16 g/ft³ (1.913 kg/m³), assuming they are in the form of nitrogen dioxide, at 68° F (20° C) and 760 mm Hg (101.3 kPa) pressure.

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NOx_{conc} = Oxides of nitrogen concentration of the dilute exhaust sample corrected for background, in ppm.

$$NOx_{conc} = NOx_e - NOx_d\,(1-1/DF)$$

where:

NOx_e = Oxides of nitrogen concentration of the dilute exhaust sample as measured, in ppm.

NOx_d = Oxides of nitrogen concentration of the dilute air as measured, in ppm.

(3) CO_{mass} = Carbon monoxide emissions, in grams per test phase.

$Density_{CO}$ = Density of carbon monoxide is 32.97 g/ft³ (1.164 kg/m³), at 68° F (20° C) and 760 mm Hg (101.3 kPa) pressure.

CO_{conc} = Carbon monoxide concentration of the dilute exhaust sample corrected for background, water vapor, and CO_2 extraction, in ppm

$$CO_{conc} = CO_e - CO_d\,(1-1/DF)$$

where:

CO_e = Carbon monoxide concentration of the dilute exhaust sample volume corrected for water vapor and carbon dioxide extraction, in ppm. The calculation assumes the carbon to hydrogen ratio of the fuel is 1:1.85.

$$CO_e = (1-0.01925\ CO_{2e} - 0.000323\ R)\ CO_{em}$$

where:

CO_{em} = Carbon monoxide concentration of the dilute exhaust sample as measured, in ppm.

CO_{2e} = Carbon dioxide concentration of the dilute exhaust sample, in percent.

R = Relative humidity of the dilution air, in percent (see § 86.142(n)).

CO_d = Carbon monoxide concentration of the dilution air corrected for water vapor extraction, in ppm.

$$CO_d = (1-0.000323\ R)\ CO_{dm}$$

where:

CO_{dm} = Carbon monoxide concentration of the dilution air sample as measured, in ppm.

NOTE: If a CO instrument which meets the criteria specified in § 86.111 is used and the conditioning column has been deleted, CO_{em} can be substituted directly for CO_e and CO_{dm} can be substituted directly for CO_d

(4) CO_{2mass} = Carbon dioxide emissions, in grams per test phase.

$DensityCO_2$ = Density of carbon dioxide is 51.81 g/ft³ (1.830 kg/m³), at 68° F (20° C) and 760 mm Hg (101.3 kPa) pressure.

CO_{2conc} = Carbon dioxide concentrations of the dilute exhaust sample corrected for background, in percent.

$$CO_{2conc} = CO_{2e} - CO_{2d}\,(1-1/DF)$$

Where:

CO_{2d} = Carbon dioxide concentration of the dilution air as measured, in percent.

(5) $DF = 13.4/[CO_{2e} + (HC_e + CO_e)\ 10^{-4}]$

K_H = Humidity correction factor.

$K_H = 1/[1-0.0047(H-75)]$

for SI units $= 1/[1-0.0329(H-10.71)]$

where:

H = Absolute humidity in grains (grams) of water per pound (kilogram) of dry air.

$H = [(43.478)R_a \times P_d]/[P_B - (P_d \times R_a/100)]$

for SI units, $H = [(6.211)R_a \times P_d]/[P_b - (P_e \times R_a/100)]$

R_a = Relative humidity of the ambient air, in percent.

P_d = Saturated vapor pressure, in mm Hg (kPa) at the ambient dry bulb temperature.

P_B = Barometric pressure, in mm Hg (kPa).

V_{mix} = Total dilute exhaust volume in cubic feet per test phase corrected to standard conditions (528 R) (293 K) and 760 mm Hg (101.3 kPa)).

For PDP-CVS. V_{mix} is:

$$V_{mix} = V_o \times N(P_B - P_A)\ 528\ R/(760\text{ mm Hg})\ (T_p)$$

for SI units,

$$V_{mix} = V_o \times N(P_B - P_A)\ (293.15\ K)/(101.325\text{ kPa})\ (T_p)$$

where:

V_o = Volume of gas pumped by the positive displacement pump, in cubic feet (m^3) per revolution. This volume is dependent on the pressure differential across the positive displacement pump.

N = Number of revolutions of the positive displacement pump during the test phase while samples are being collected.

P_B = Barometric pressure, in mm Hg (kPa).

P_A = Pressure depression below atmospheric measured at the inlet to the positive displacement pump, in mm Hg (kPa) (during an idle mode).

T_p = Average temperature of dilute exhaust entering positive displacement pump during test, R(K).

(d) Example calculation of mass values of exhaust emissions using positive displacement pump:

(1) For the "transient" phase of the cold start test assume the following:

$V_o = 0.29344$ ft³/revolution; N = 10,485; R = 48.0 percent; R_a = 48.2 percent; P_B = 762 mm Hg; P_d = 22.225 mm Hg; P_A = 70 mm Hg; T_p = 570 R; HC_e = 105.8 ppm, carbon equivalent; NO_{xe} = 11.2 ppm; CO_{em} = 306.6 ppm; CL_{2e} = 1.43 percent; HC_d = 12.1 ppm; NO_{xd} = 0.8 ppm; CO_{dm} = 15.3 ppm.

CO_{2d} = 0.032 %; D_{ct} = 3.598 miles.

then:

$V_{mix} = (0.29344)\ (10,485)\ (762-70)\ (528)/(760)(570) = 2595.0$ ft³ per test phase.

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$H = (43.478)\ (48.2)\ (22.225)/[762 \cdot (22.225 \times 48.2/100)] = 62$ grains of water per pound of dry air

$K_H = 1/[1 - 0.0047(62-75)] = 0.9424$

$CO_c = [1 - 0.01925\ (1.43) - 0.000323\ (48)]\ 306.0 = 293.4$ ppm

$CO_d = [1 - 0.000323\ (48)]\ 15.3 = 15.1$ ppm

$DF = 13.4/[1.43 + (105.8 + 293.4) \times 10^{-4}] = 9.116$

$HC_{conc} = 105.8 - 12.1(1 - 1/9.116) = 95.03$ ppm.

$HC_{mass} = (2595)\ (16.33)\ (95.03/1,000,000) = 4.027$ grams per test phase.

$NOx_{conc} = 11.2 - 0.8\ (1 - 1/9.116) = 10.49$ ppm

$NOx_{mass} = (2595)\ (54.16)\ (10.49/1,000,000)\ (0.9424) = 1.389$ grams per test phase.

$CO_{conc} = 293.4 - 15.1\ (1 - 1/9.116) = 280.0$ ppm

$CO_{mass} = (2595)\ (32.97)\ (280/1,000,000) = 23.96$ grams per test phase.

$CO_{2conc} = 1.43 - .032\ (1 - 1/9.116) = 1.402\%$

$CO_{2mass} = (2595.0)\ (51.85)\ (1.402/100) = 1886$ grams per test phase.

(2) For the stabilized portion of the cold start test assume that similar calculations resulted in the following:

$HC_{mass} = 0.62$ grams per test phase
$NOx_{mass} = 1.27$ grams per test phase
$CO_{mass} = 5.98$ grams per test phase
$CO_{2mass} = 2346$ grams per test phase.
$D_s = 3.902$ miles.

(3) For the "transient" portion of the hot start test assume that similar calculations resulted in the following:

$HC_{mass} = 0.51$ grams per test phase
$NOx_{mass} = 1.38$ grams per test phase
$CO_{mass} = 5.01$ grams per test phase
$CO_{2mass} = 1758$ grams per test phase.
$D_{ht} = 3.598$ miles.

(4) Weighted mass emission results:

$HC_{wm} = 0.43\ [(4.027 + 0.62)/(3.598 + 3.902)] + 0.57\ [(0.51 + 0.62)/(3.598 + 3.902)] = 0.352$ grams per vehicle mile.

$NO_{xwm} = 0.43\ [(1.389 + 1.27)/(3.598 + 3.902)] + 0.57\ [(1.38 + 1.27)/(3.598 + 3.902)] = .354$ grams per vehicle mile.

$CO_{wm} = 0.43\ [(23.96 + 5.98)/(3.598 + 3.902)] + 0.57\ [(5.01 + 5.98)/(3.598 + 3.902)] = 2.55$ grams per vehicle mile.

$CO_{2wm} = 0.43\ [(1886 + 2346)/(3.598 + 3.902)] + 0.57\ [(1758 + 2346)/(3.598 + 3.902)] = 555$ grams per vehicle mile.

[42 FR 32954, June 28, 1977, as amended at 42 FR 45655, Sept. 12, 1977; 43 FR 52922, Nov. 14, 1978]

§ 86.145–78 [Reserved]

§ 86.145–82 Calculations; particulate emissions.

(a) The final reported test results for the mass particulate (M_p) in grams/mile shall be computed as follows.

$$M_p = 0.43(M_{p1} + M_{p2})/(D_{ct} + D_s) + 0.57(M_{p3} + M_{p2})/(D_{ht} + D_s)$$

Where:

(1) M_{p1} = Mass of particulate determined from the "transient" phase of the cold start test, in grams per test phase. (See § 86.110-82(c)(1) for determination.)

(2) M_{p2} = Mass of particulate determined from the "stabilized" phase of the cold start test, in grams per test phase. (See § 86.110-82(c)(1) for determination.)

(3) M_{p3} = Mass of particulate determined from the "transient" phase of the hot start test, in grams per test phase. (See § 86.110-82(c)(1) for determination).

(4) D_{ct} = The measured driving distance from the "transient" phase of the cold start test, in miles.

(5) D_s = The measured driving distance from the "stabilized" phase of the cold start test, in miles.

(6) D_{ht} = The measured driving distance from the "transient" phase of the hot start test, in miles.

(b) The mass of particulate for each phase of testing is determined as follows:

$$M_{pj} = [V_{mix_j} + V_{ep_j}] \times \left[\frac{P_a}{V_{ep_j}} - \frac{P_b}{V_{bp}}(1 - 1/DF)\right]$$

where:

(1) j = 1, 2 or 3 depending on which phase the mass of particulate is being determined for (i.e., the "transient" phase of the cold start test, the "stabilized" phase of the cold start test, or the "transient" phase of the hot start test).

(2) V_{mix} = Total dilute exhaust volume in cubic meters per test, corrected to standard conditions 528°R (293K) and 29.92 in Hg (101.3 kPa). V_{mix} is further defined in § 86.144.

(3) P_a = mass of particulate per test on the exhaust filter(s), grams.

(4) P_b = mass of particulate on the "background" filter, grams.

(i) The background particulate level, P_b, inside the dilution air filter box at EPA is very low. P_b will be assumed =

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0, and background particulate samples will not be taken with each exhaust sample. It is recommended that background particulate checks be made periodically to verify the low level.

(ii) Any manufacturer may make the same assumption without prior EPA approval.

(iii) If P_b is assumed = 0, then no background correction is made. The equation for particulate mass emissions then reduces to:

$$M_{p_i} = \frac{[V_{mix_i} + V_{ep_i}] \times P_{e_i}}{V_{ep_i}}$$

(6) V_{ep} = total volume of sample pulled through the filter, cubic feet at standard conditions.

$$V_{ep} = \frac{V_{ap} \times (P_{bar} + P_{ip}) \times 528}{T_{ip} \times 29.92}$$

where:

(i) V_{ap} = corrected (according to procedure specified in § 85.120) dilute exhaust sample volume, cubic feet.

(ii) P_{bar} = barometric pressure, in Hg.

(iii) P_{ip} = pressure elevation above ambient measured at the inlet to the dilute exhaust sample gas meter or flow instrument, in Hg. (For most gas meters with unrestricted discharge P_{ip} is negligible and can be assumed = 0.)

(iv) T_{ip} = average temperature of the dilute exhaust sample at the inlet to the gas meter or flow instrument, °R.

(7) V_{bp} = total volume of the background sample, cubic feet at standard conditions. (V_{bp} is not required if P_b is assumed = 0.) It is calculated using the following formula:

$$V_{bp} = \frac{V_{ab} \times (P_{bar} + P_{ib}) \times 528}{T_{ib} \times 29.92}$$

where:

(i) V_{ab} = corrected (according to procedure specified in § 85.120) background sample volume, cubic feet.

(ii) P_{bar} = barometric pressure, in. Hg.

(iii) P_{ib} = pressure elevation above ambient measured at the inlet to the background gas meter or flow instrument, in Hg. (For most gas meters with unrestricted discharge P_{ib} is negligible and can be assumed = 0.)

(iv) T_{ib} = average temperature of the background sample at the inlet to the gas meter or flow instrument, °R.

(8) DF = dilution factor. (DF is not required if P_b is assumed = 0.)

[45 FR 14523, Mar. 5, 1980, as amended at 46 FR 50494, Oct. 13, 1981]

Subpart C—[Reserved]

Subpart D—Emission Regulations for New Gasoline-Fueled and Diesel Heavy-Duty Engines; Gaseous Exhaust Test Procedures

AUTHORITY: Secs. 202, 206, 207, 208, 301(a), Clean Air Act, as amended (42 U.S.C. 1857f-1, 1857f-5, 1857f-5a, 1857f-6, 1857g(a)).

SOURCE: 42 FR 45154, Sept. 8, 1977, unless otherwise noted.

§ 86.301-79 Scope; applicability.

This subpart contains gaseous emission test procedures for gasoline-fueled and Diesel heavy-duty engines. It applies to 1979 and later model years.

§ 86.302-79 Definitions.

The definitions in §§ 86.077-2, 86.078-2, and 86.079-2 apply to this subpart.

86.303-79 Abbreviations.

The abbreviations in § 86.078-3 apply to this subpart.

§ 86.304-79 Section numbering; construction.

(a) The model year of initial applicability is indicated by the section number. The two digits following the hyphen designate the first model year for which a section is effective. A section remains effective until superseded.

Example: Section § 86.311-79 applies to the 1979 and subsequent model years until superseded. If a section § 86.311-81 is promulgated it would take effect beginning with the 1981 model year; § 86.311-79 would apply to model years 1979 and 1980.

(b) A section reference without a model year suffix refers to the section applicable for the appropriate model year.

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(c) Unless indicated, all provisions in this subpart apply to both gasoline-fueled and Diesel heavy-duty engines.

§ 86.305-79 Introduction; structure of subpart.

(a) This subpart describes the equipment required and the procedures to follow in order to perform exhaust emission tests on gasoline-fueled and Diesel heavy-duty engines. Subpart A sets forth the testing requirments and test intervals necessary to comply with EPA certification procedures.

(b) Four topics are addressed in this subpart. Sections 86.306 through 86.318 set forth specifications and equipment requirements; §§ 86.319 through 86.333 discuss calibration methods and frequency; test procedures and data requirements are listed (in approximately chronological order) in §§ 86.334 through 86.343; and calculation formulas are found in §§ 86.344 and 86.345. Alternative procedures and calculations are set forth in §§ 86.346 and 86.347.

§ 86.306-79 Equipment required and specifications; overview.

(a) This subpart contains procedures for both gasoline-fueled and Diesel engine gaseous emission tests. Generally, the equipment required is identical for both types of engines. Equipment required and specifications are found in §§ 86.307 through 86.318.

(b) Some analyzer specifications refer to calibration checks found in §§ 86.320 through 86.332.

§ 86.307-82 Fuel specifications.

(a) *Gasoline.* (1) Gasoline having the following specifications will be used by the Administrator in exhaust emission testing. Gasoline having the following specifications or substantially equivalent specifications approved by the Administrator shall be used by the manufacturer in exhaust testing, except that the lead and octane specifications do not apply.

Item designation	ASTM	Leaded	Unleaded
Octane, research, minimum	D2699	100	96
PB (organic), grams/U.S. gallon		[1] 1.4	0.00-0.05
Distillation Range:			
IBP, F	D86	75-95	75-95
10 pct point, F	D86	120-135	120-135
50 pct point, F	D86	200-230	200-230
90 pct point, F	D86	300-325	300-325
EP, F (maximum)	D86	415	415
Sulfur, weight percent, maximum	D1266	0.10	0.10
Phosphorus, grams/U.S. gallon, maximum		0.01	0.005
RVP pounds per square inch	D323	8.0-9.2	8.0-9.2
Hydrocarbon composition:			
Olefins, percent, maximum	D1319	10	10
Aromatics, percent maximum	D1319	35	35
Saturates	D1319	[2]	[2]

[1] Minimum.
[2] Remainder.

(2) Gasoline representative of commercial gasoline which will be generally available through retail outlets shall be used in service accumulation. For leaded fuel the minimum lead content shall be equal to the average lead content found in regular leaded gasoline in the fuel survey prescribed by the Administrator. Where the Administrator determines that engines represented by a test engine will be operated using gasoline of different lead content from that prescribed in this paragraph, he may consent in writing to use of a gasoline with a different lead content. The octane rating of the gasoline used shall be no higher than 4.0 research octane numbers above the minimum recommended by the manufacturer and have a minimum sensitivity of 7.5 octane numbers for unleaded fuel and 7.0 octane numbers for leaded fuel, where sensitivity is defined as research octane number minus motor octane number.

(b) *Diesel Fuel.* (1) The diesel fuels employed for testing shall be clean

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and bright, with pour and cloud points adequate for operability. The diesel fuel may contain nonmetallic additives as follows: Cetane improver, metal deactivator, antioxident, dehazer, antirust pour depressant, dye, and dispersant.

(2) Diesel fuel meeting the following specifications, or substantially equivalent specifications approved by the Administrator, shall be used in exhaust emissions testing. The grade of diesel fuel recommended by the engine manufacturer commercially designated as "Type 1-D" or "Type 2-D", shall be used.

Item	ASTM test method No.	Type 1-D	Type 2-D
Cetane Number	D613, D86	48-54	42-50
Distillation range			
IBP, F		330-390	340-400
10 percent point, F		370-430	400-460
50 percent point, F		410-480	470-540
90 percent point, F		460-520	550-610
EP, F		500-560	580-660
Gravity, API	D287	40-44	33-37
Total sulfur, percent	D129 or D2622	0.05-0.02	0.2-0.5
Hydrocarbon composition	D1319		
Aromatics, percent (minimum		[1]8	[1]27
Paraffins, naphthenes, olefins		(2)	(2)
Flashpoint, F (minimum)	D93	120	130
Viscosity, centistokes	D445	1.6-2.0	2.0-3.2

[1] Minimum.
[2] Remainder.

(3) Diesel fuel meeting the following specifications, or substantially equivalent specifications approved by the Administrator, shall be used in service accumulation. The grade of diesel fuel recommended by the engine manufacturer, commercially designated as "Type 1-D" or "Type 2-D", shall be used.

Item	ASTM test method No.	Type 1-D	Type 2-D
Cetane (minimum)	D613	42-56	38-58
Distillation range 90 pct point, F	D86	440-530	540-630
Gravity, API	D287	39-45	30-42
Total sulfur, percent	D129 or D2622	0.05	0.2
Flashpoint, F (minimum)	D96	120	130
Viscosity, centistokes	D445	1.2-2.2	1.5-4.5

[1] Minimum.

(4) Other petroleum distillate fuels may be used for testing and service accumulation provided:

(i) They are commercially available;

(ii) Information, acceptable to the Administrator, is provided to show that only the designated fuel would be used in customer service;

(iii) Use of a fuel listed under paragraphs (b) (2) and (3) of this section would have a detrimental effect on emissions or durability; and

(iv) Written approval from the Administrator of the fuel specifications was provided prior to the start of testing.

(5) The specification range of the fuels to be used under subparagraphs (b)(2), (b)(3), and (b)(4) of this section shall be reported in accordance with § 86.082-21(b)(3).

(c) Fuels not meeting the specifications set forth in this section may be used only with the advance approval of the Administrator.

[46 FR 50494, Oct. 13, 1981]

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§ 86.308-79 Gas specifications.

(a) *Analyzer gases.* (1) *Calibration gases for the CO and CO_2* analyzers shall have zero grade nitrogen as a diluent. Combined CO and CO_2 span gases are permitted. Zero grade nitrogen shall be the diluent for CO and CO_2 span gases.

(2) Calibration or span gases for the hydrocarbon analyzer shall be propane with zero-grade nitrogen as a diluent when testing gasoline-fueled engines. For Diesel engine tests the diluent shall be zero-grade air.

(3) Calibration or span gases for the NO_x analyzer shall be NO named as NO_x with a maximum NO_2 concentration of 5 percent of the nominal value. Zero-grade nitrogen shall be the diluent.

(4) Zero-grade gases for hydrocarbon analyzers shall be nitrogen when testing gasoline-fueled engines and air when testing Diesel engines.

(5) Zero-grade gases for the carbon monoxide, carbon dioxide and oxides of nitrogen analyzers shall be either zero-grade air or zero-grade nitrogen.

(6) The allowable zero grade gas (air or nitrogen) impurity concentrations shall not exceed 2 ppmC hydrocarbon, 10 ppm carbon monoxide, 400 ppm carbon dioxide and 1 ppm nitric oxide.

(7) "Zero-grade air" includes artificial "air" consisting of a blend of nitrogen and oxygen with oxygen concentrations between 18 and 21 mole percent.

(b) *Calibration gas.* Calibration gas values are to be derived from NBS "Standard Reference Materials" (SRM's) or other gas standards approved by the Administrator. The uncertainty of the assigned calibration gas values shall not exceed 2.0 percent of the assigned value. The uncertainty is defined as the sum of the precision errors (at the 90 percent confidence level) and the bias errors. Precision and bias errors apply to both the equipment and the derivation procedures.

(c) *Span gas.* Span gas values are to be derived from NBS "Standard Reference Materials" (SRM's) or other gas standards approved by the Administrator. The uncertainty of the assigned calibration gas values shall not exceed 3.0 percent of the assigned value. The uncertainty is defined as the sum of the precision errors (at the 90 percent confidence level) and the bias errors. Precision and bias errors apply to both the equipment and the derivation procedures.

(d) *Hydrocarbon analyzer fuel*—(1) *The fuel shall contain 40±2 percent hydrogen.* The balance shall be helium. The mixture shall contain less than 2 ppmC hydrocarbon.

(2) *Aiternate pure hydrogen fuel.* Some HFID's are designed to operate on pure hydrogen. Generally the HFID fuel is incompatible with good relative hydrocarbon response.

(i) For Diesel engines this fuel is not recommended. However, this fuel may be used if the engine manufacturer demonstrates, on each basic combustion system (i.e., 4 cycle DI, 2 cycle DI, 4 cycle pre-cup, etc.) that an HFID using this fuel produces comparable results to an HFID using 40% H_2/60% He fuel. These data must be submitted to and approved by the Administrator prior to testing. Pure H_2 fuel, that may be allowed for testing, must contain at least 99.0 percent hydrogen and contain less than 2 ppmC hydrocarbon.

(ii) For gasoline-fueled engines, pure hydrogen fuel for the HFID is not allowed.

(e) *Hydrocarbon analyzer burner air.* The concentration of oxygen must be within 1 mole percent of the oxygen concentration of the burner air used in the latest oxygen interference check ($\%O_2I$). If the difference in oxygen concentration is greater than 1 mole percent, then the oxygen interference must be checked and the analyzer adjusted if necessary, to meet the $\%O_2I$ requirements. The burner air must contain less than 2 ppmC hydrocarbon.

(f) Oxygen interference check gases shall contain propane with 350 ppmC±75 ppmC hydrocarbon. The concentration value shall be determined to calibration gas tolerances by chromatographic analysis of total hydrocarbons plus impurities or by dynamic blending. Nitrogen shall be the predominant diluent with the balance oxygen. Blends required for gasoline-fueled and Diesel engine testing are as follows:

Applicability	O_2 concentration (percent)	Balance
Diesel	21 (20 to 22)	N_2
Diesel and gasoline	10 (9 to 11)	N_2
Do	5 (4 to 6)	N_2
Gasoline	0 (0 to 1)	N_2

(g) Proportioning and blending devices may be used to obtain required gas concentration.

[42 FR 45154, Sept. 8, 1977, as amended at 46 FR 50495, Oct. 13, 1981]

§ 86.309-79 Sampling and analytical system; schematic drawing.

(a) Any variation from the specifications in this subpart including performance specifications and emission detection methods may be used only with prior approval by the Administrator.

(b) Schematic drawing.

(1) An example of a sampling and analytical system which may be used for testing under this subpart is shown in Figure D79-1. All components or parts of components that are wetted by the sample or corrosive calibration gases shall be either chemically cleaned stainless steel or inert material, e.g. polytetrafluoroethylene resin. The use of "gauge savers" or "protectors" with nonreactive diaphragms to reduce dead volumes is permitted. The specific detection methods to be used for each exhaust component can be found in § 86.316 for CO, § 86.317 for HC, and § 86.318 for NO_x. Additional components such as instruments, valves, solenoids, pumps, switches, etc. may be employed to provide additional information and coordinate the functions of the component systems.

(2) The following requirements must be incorporated in each system used for testing under this subpart.

(i) All analyzers must obtain the sample to be analyzed from the same sample line.

(ii) The sample transport system from the engine exhaust pipe to the HC analyzer and the NO_x analyzer must be heated as is indicated in Figure D79-1.

(iii) Carbon monoxide and carbon dioxide measurements must be made on a dry basis. Specific requirements for the means of drying the sample can be found in § 86.309 (b)(5) and § 86.311(e).

(iv) All NDIR analyzers must have a pressure gauge immediately downstream of the analyzer. The gauge tap must be within 2 inches of the analyzer exit port. Gauge specifications can be found in § 86.309(b)(3).

(v) All bypass and analyzer flows exiting the analysis system must be measured. Capillary flows such as in HFID and CL analyzers are excluded. For each ND IR analyzer with a flow meter located upstream of the analyzer, and upstream pressure gauge must be used. The gauge tap must be within 2 inches of the analyzer entrance port.

(vi) Calibration or span gases for the NO_x measurement system must pass through the NO_2 to NO converter.

(vii) The temperature of the NO_2 to NO converter must be displayed continuously.

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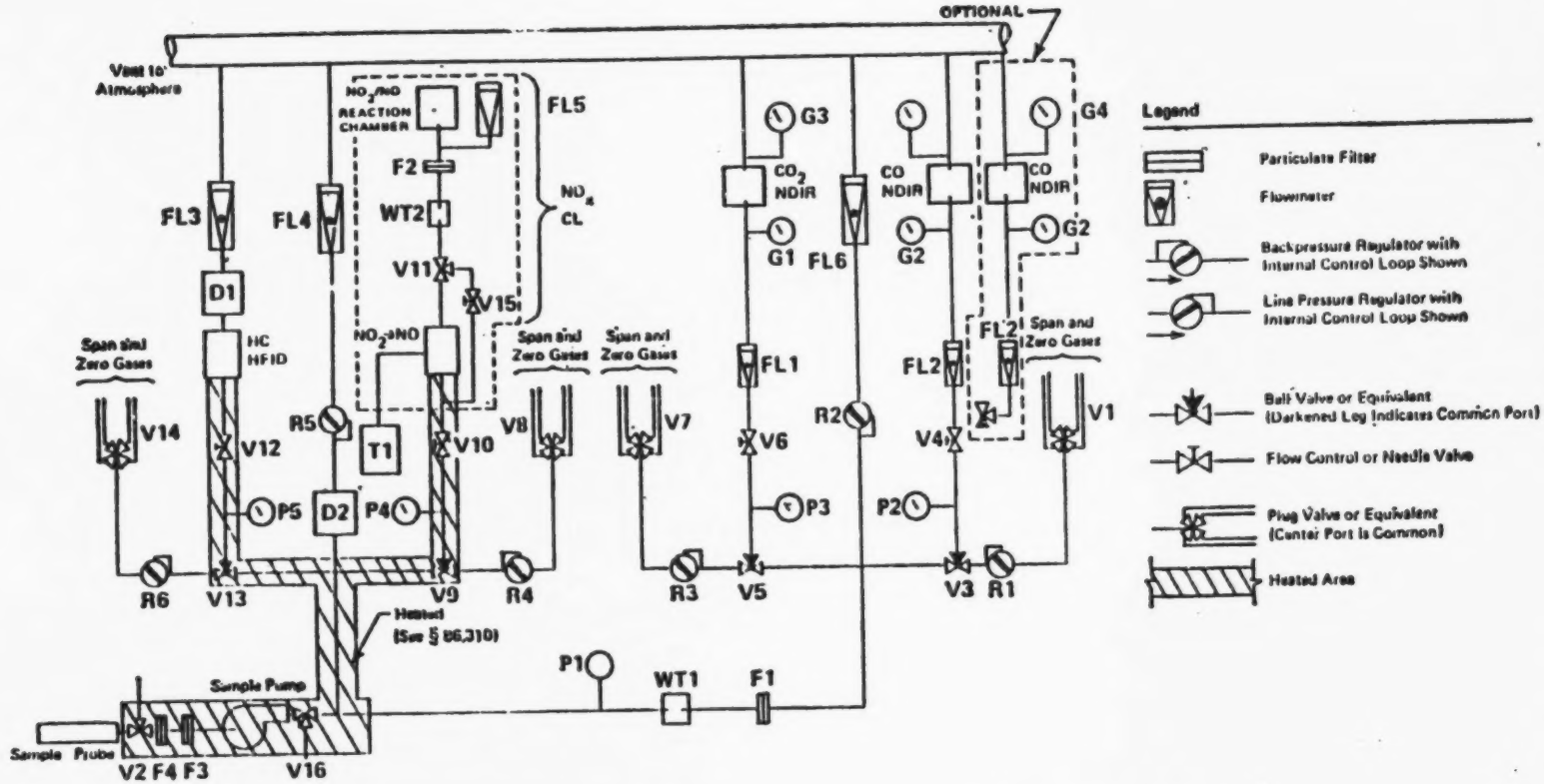

Figure D79-1 HEAVY-DUTY EXHAUST GAS SAMPLING AND ANALYTICAL TRAIN

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(c) *System components list.* The following is a list of components shown in Fig. D79-1 by numeric identifier.

(1) *Filters.* Glass fiber filter paper is permitted for F1, F2, and F3. Optional filter F4 is a coarse filter for large particulates.

(i) F1—Fine particulate filter.

(ii) F2—Fine particulate filter.

(iii) F3—Fine heated particulate filter.

(iv) F4—Coarse heated particulate filter.

(2) *Flowmeters.* (i) Flowmeters FL 1 and FL 2 indicate sample flow rates through the CO and CO_2 analyzers.

(ii) Flowmeters FL 3, FL 4, FL 5, and FL 6 indicate bypass flow rates.

(3) *Gauges.* Downstream gauges are required for any system used for testing under this subpart. Upstream gauges may be required under this subpart per § 86.309(b)(2)(v).

(i) Upstream gauges G1 and G2 measure the input to the CO and CO_2 analyzers.

(ii) Downstream gauges G3 and G4 measure the exit pressure of the CO and CO_2 analyzers. If the normal operating range of the downstream gauges is less than 3 inches of water, then the downstream gauges must be capable of reading both pressure and vacuum.

(4) *Pressure gauges.* (i) P1—bypass pressure.

(ii) P2, P3, P4 and P5—sample or span pressure at inlet to flow control valves.

(5) *Water traps.* Water traps WT1, and WT2 to remove water from the sample. A water trap performing the function of WT1 and meeting the specifications in § 86.311(e) is required for any system used for testing under this subpart. Chemical dryers are not an acceptable method of removing the water. Water removal by condensation is acceptable. Means other than condensation may be used only with prior approval from the Administrator.

(6) *Regulators.* (i) R1, R3, R4, and R6—linepressure regulators to control span pressure at inlet to flow control valves.

(ii) R2 and R5—back presssure regulators to control sample pressure at inlet to flow control valves.

(7) *Valves.* (i) V1, V7, V8, and V14—selector valves to select zero or calibration gases.

(ii) V2—optional heated selector valve to purge the sample probe, perform leak checks, or to perform hang-up checks.

(iii) V3 and V5—Selector valves to select sample or span gases.

(iv) V4, V6, and V15—flow control valves.

(v) V9 and V13—heated selector valve to select sample or span gases.

(vi) V10 and V12—heated flow control valves.

(vii) VII—Selector valve to select NO_x or bypass mode in the chemiluminescence analyzer.

(viii) V16—heated selector valve to perform leak checks.

(8) *Pump.* Sample transfer pump to transport sample to analyzers.

(9) *Temperature sensor.* A temperature sensor (T1) to measure the NO_2 to NO converter temperature is required for any system used for testing under this subpart.

(10) *Dryer.* Dryers D1 and D2 to remove the water from the bypass flows to prevent condensation in flowmeters FL3, FL4, and FL6.

§ 86.310-79 Sampling and analytical system; component specifications.

(a) *Temperature.* (1) *For gasoline-fueled engines any heated component;*

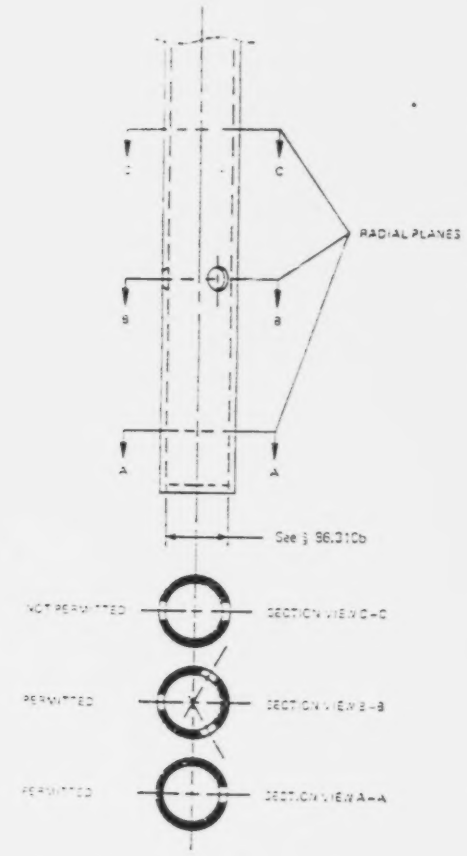
(i) In the HC sample path must be maintained above 110°C (230°F) and shall not exceed 230°C (446°F),

(ii) In the NO_x sample path must be maintained above 60°C (140°F) and shall not exceed 230°C (446°F).

(2) *For Diesel engines any heated component;*

(i) In the HC sample path must be maintained above 180°C (356°F) and shall not exceed 230°C (446°F).

(ii) In the NO_x sample path must be maintained above 60°C (140°F) and shall not exceed 230°C (446°F).



SAMPLE PROBE AND TYPICAL HOLE SPACINGS

(3) The sample line outside wall temperature must be maintained at the temperature specified in this paragraph. An exception is made for the first 4 feet of sample line from the exhaust duct. The upper temperature tolerance for this 4 foot section is waived and only the minimum temperature specification applies.

(b) *Sample probe.* (1) The sample probe shall be a straight, closed end, stainless steel, multi-hole probe. The Inside Diameter (I.D.) shall not be greater than the I.D. of the sample line (+.010 in.). The wall thickness of the probe shall not be greater than .040 inch. The fitting that attaches the probe to the exhaust pipe shall be as small as practical in order to minimize heat loss from the probe.

(2) There shall be a minimum of three holes in the probe. The spacing of the radial planes for each hole in the probe must be such that they cover approximately equal cross-sectional areas of the exhause duct. The angular spacing of the holes must be approximately equal. The angular spacing of any two holes in one plane may not be 180° ±20° (i.e., section C-C of Figure D79-2). The holes should be sized such that each has approximately the same flow. If only three holes are used, they may not all be in the same radial plane. See Figure D79-2.

(3) The probe shall extend radially across the exhaust duct. The probe must pass through the approximate center and must extend across at least 80 percent of the diameter of the duct.

(c) *Sample transfer.* (1) The maximum I.D. of the sample line shall not exceed 0.52 inch.

(2) If valve V2 is used, the sample probe must connect directly to valve V2. The location of optional valve V2 may not be greater than 4 feet from the exhaust duct.

(3) The location of optional valve V16 may not be greater than 24 inches from the sample pump. The leakage rate for this section on the pressure side of the sample pump may not exceed the leakage rate specification for the vacuum side of the pump.

(d) *Venting.* All vents including analyzer vents, bypass flow, and pressure relief vents of regulators should be vented in such a manner to avoid endangering personnel in the immediate area.

[42 FR 45154, Sept. 8, 1977, as amended at 46 FR 50495, Oct. 13, 1981]

§ 86.311-79 Miscellaneous equipment; specifications.

(a) *Chart recorders.* (1) The minimum chart speed allowed is 3 inches per minute for gasoline-fueled engines and 0.5 inches per minute for Diesel engines.

(2) When testing gasoline-fueled engines all chart recorders (analyzers, torque, rpm, etc.) shall be provided with Automatic markers which indicate one second intervals. Preprinted chart paper (one second intervals) may be used in lieu of the automatic markers provided the correct chart speed is used.

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(b) *Accuracy of temperature measurements.* (1) The following temperature measurements shall be accurate to within 1.2° C:

(i) Temperature measurements used in calculating the engine intake humidity:

(ii) The temperature of the fuel in volume measuring flow rate devices;

(iii) The temperature of the sample within the water trap(s).

(2) All other temperature measurements shall be accurate within 2.5° C.

(c) *Intake air humidity and temperature measurements.* (1) Humidity conditioned air supply. Air that has had its absolute humidity altered is considered humidity-conditioned air. For this type of intake air supply, the humidity measurements must be made within the intake air supply system, and after the humidity conditioning has taken place.

(2) Nonconditioned air supply. Humidity measurements in non-conditioned intake air supply systems must be made in the intake air stream entering the supply system. Alternatively, the humidity measurements can be measured within the intake air supply stream.

(3) Engine intake air temperature measurement must be made within 48 inches of the engine. The measurement location must be made either in the supply system or in the air stream entering the supply system.

(d) *Sample component surface temperature.* For each component (pump, sample line section, filters, etc.) in the heated portion of the sampling system that has a separate source of power or heating element, use engineering judgment to locate the coolest portion of that component and monitor the temperature at that location. If several components are within an oven, then only the surface temperature of the component with the largest thermal mass and the oven temperature need be measured.

(e) If water is removed by condensation, the sample gas temperature or sample dew point must be monitored either within the water trap or downstream. It may not exceed 7°C (45°F).

[42 FR 45154, Sept. 8, 1977, as amended at 46 FR 50495, Oct. 13, 1981]

§ 86.312-79 Dynamometer and engine equipment specifications.

(a) *Dynamometer.* (1) The dynamometer test stand and other instruments for measurement of power output shall be accurate to within 2 percent of point at all power settings above 10 percent of full-scale. Below 10 percent of full-scale the accuracy shall be within 5 percent of point. The dynamometer must be capable of performing the test cycle described in § 86,335 or § 86.336. Dynamometers used for testing gasoline-fueled engines must have sufficient motoring capability to meet the test requirements. A 60-tooth wheel in combination with a frequency counter shall be considered an absolute standard for engine speed.

(2) *Dynamometer calibration weights.* A minimum of 6 calibration weights for each range used are required. The weights must be equally spaced and traceable to within 0.5 percent of NBS weights. Laboratories located in foreign countries may certify calibration weights to local government bureau standards.

(b) *Engine cooling.* Means of engine cooling which will maintain the engine operating temperatures (e.g., intake air, oil, water, etc.) at approximately the same temperature as specified by the manufacturer shall be used. Auxiliary fan(s) may be used to maintain engine cooling during operation on the dynamometer.

(c) *Exhaust system.* (1) When testing gasoline-fueled engines:

(i) A chassis-type exhaust system including muffler(s) shall be used. The exhaust system must have a single tail pipe. For engines designed for a dual exhaust system, a standard or specially fabricated "Y" pipe may be used. The "Y" pipe may be located upstream of a single muffler or downstream of a single muffler or downstream of dual mufflers. The potential increase in backpressure due to the use of a single tail pipe instead of dual pipes may be compensated for by using larger than standard exhaust system components downstream of the "Y" pipe. For systems with the "Y" pipe upstream of the muffler, the backpressure at the exhaust manifold

exit with the single exhaust system must be comparable to the standard dual exhaust system under the test conditions specified in § 86.335.

(ii) For all catalyst systems the distance from the exhaust manifold flange(s) to the catalyst shall be the same as in the vehicle configuration unless the manufacturer provides temperature data showing equivalent performance at another location.

(iii) For catalyst systems, the probe shall be located in the single exhaust pipe and from 2 to 10 feet downstream of the catalyst(s) and at least 2 feet downstream of the "Y" intersection of any "Y" pipe (if used).

(iv) For noncatalyst systems, the probe shall be located in the single exhaust pipe downstream of the muffler(s) and from 3 to 20 feet downstream from the exhaust manifold flange or turbocharger exit flange. The probe shall also be at least 2 feet downstream of the "Y" intersection of any "Y" pipe (if used).

(v) For all exhaust systems, the probe shall be located at least 24 inches from the end of the tail pipe. Additional exhaust pipe may be added to the tail pipe to meet the specification.

(2) When testing Diesel engines, a noninsulated exhaust system extending 15±5 feet from the exhaust manifold, or the crossover junction in the case of Vee engines, shall be used. The exhaust back pressure must be within 0.2 inch Hg. of the upper limit at maximum rated horsepower, as established by the engine manufacturer in his sales and service literature for vehicle application. A conventional automotive muffler of a size and type commonly used with the engine being tested shall be employed in the exhaust system during smoke emission testing. The terminal 2 feet of the exhaust pipe shall be a circular cross section and be free of elbows and bends. The end of the pipe shall be cut off squarely. The terminal 2 feet of the exhaust pipe shall have a nominal inside diameter in accordance with the engine being tested, as specified below:

Maximum rated horsepower	Exhaust pipe inside diameter (inches)
Less than 101	2
101 to 200	3
201 to 300	4
301 or more	5

[42 FR 45154, Sept. 8, 1977, as amended at 43 FR 52922, Nov. 14, 1978]

§ 86.313-79 Air flow measurement specifications; Diesel engines.

(a) The air flow measurement method used must have a range large enough to accurately measure the air flow over the engine operating range during the test. Overall measurement accuracy must be ±2 percent of full-scale value of the measurement device for all modes except the idle and 2-percent modes. For the idle and 2-percent modes, the measurement accuracy shall be ±5 percent or less of the full-scale value. The Administrator must be advised of the method used prior to testing.

(b) Corrections to the measured air mass-flow-rate shall be made when an engine system incorporates devices that add or subtract air mass (air injection, bleed air, etc.). The method used to determine the air mass from these devices shall be approved by the Administrator.

(c) An engine air inlet system presenting an air inlet restriction within 1 inch of water of the upper limit for the engine operating condition which results in maximum air flow, as established by the engine manufacturer in his sales and service literature, for the Diesel engine being tested shall be used.

§ 86.314-79 Fuel flow measurement specifications.

(a) The fuel flow rate measurement instrument must have a minimum accuracy of ±1 percent of full-scale flow rate for each measurement range used. An exception for Diesel engines is allowed at the idle and 2-percent power points. For these modes, the minimum accuracy is ±2 percent of full-scale flow rate for each measurement range used. The controlling parameters are

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the elapsed time measurement of the event and the weight or volume measurement. Restrictions on these parameters are:

(1) The error in the elapsed time measurement of the event must not be greater than 1 percent of the absolute event time. This includes errors in starting and stopping the clock as well as the period of the clock.

(2) For Diesel engines only, if the mass of fuel consumed is measured by discrete weights, then the error in the actual weight of the fuel consumed must not be greater than ±1 percent of the measuring weight. An exception for Diesel engines is allowed at the idle and 2-percent power points. For these modes the error in the actual weight of the fuel consumed must not be greater than ±2 percent of the measuring weight.

(3) If the mass of fuel consumed is measured electronically (load cell, load beam, etc.), the error in the actual weight of fuel consumed must not be greater than ±1 percent of the full-scale value of the electronic device.

(4) If the mass of fuel consumed is measured by volume flow and density, the error in the actual volume consumed must not be greater than ±1 percent of the full-scale value of the volume measuring device.

(b) For the devices that have varying mass scales (electronic weight, volume, density, etc.), measurements may not be used for calculations if the measurement is less than 20 percent of full scale.

(c) *Option.* Complete flow-rate measurement systems may be used below 20 percent of full-scale measurement as long as the combination of mass and time measurments indicate a flow rate that has an error of less than 5 percent of the absolute flow rate.

§ 86.315-79 General analyzer specifications.

(a) *Analyzer response time.* The analyzer must respond to an instantaneous step change at the entrance to the analyzer with a response equal to 95 percent of that step change in 6.0 seconds or less on all ranges used. The step change shall be at least 60 percent of full-scale chart deflection. For NO_x analyzers using a water trap, the response time increase due to the water trap and associated plumbing need not be included in the analyzer response time.

(b) *Precision.* The precision of the analyzer must be no greater than ±1 percent of full-scale concentration for each range used above 155 ppm (or ppm C), or ±2 percent for each range used below 155 ppm (or ppm C). The precision is defined as 2.5 times the standard deviation(s) of 10 repetitive responses to a given calibration or span gas.

(c) *Noise.* The analyzer peak-to-peak response to zero and calibration or span gases over any 10-second period shall not exceed 2 percent of full/scale chart deflection on all ranges used.

(d) *Zero drift.* The analyzer zero-response drift during a 1-hour period shall be less than 2 percent of full-scale chart deflection on the lowest range used. The zero-response is defined as the mean response including noise to a zero-gas during a 30-second time interval.

(e) *Span drift.* The analyzer span drift during a 1-hour period shall be less than 2 percent of full-scale chart deflection on the lowest range used. The analyzer span is defined as the difference between the span-response and the zero-response. The span-response is defined as the mean response including noise to a span gas during a 30-second time interval.

(Secs. 206, 301(a) of the Clean Air Act as amended (42 U.S.C. 7525, 7601(a))

[42 FR 45154, Sept. 8, 1977, as amended at 44 FR 16917, Mar. 20, 1979]

§ 86.316-79 Carbon monoxide and carbon dioxide analyzer specifications.

(a) Carbon monoxide and carbon dioxide measurements are to be made with nondispersive infrared (NDIR) an analyzers.

(b) The use of linearizing circuits is permitted.

(c) The minimum water rejection ratio (maximum CO_2 interference) as measured by § 86.321 shall be:

(1) For CO analyzers, 1000:1.

(2) For CO_2 analyzers, 100:1.

(d) The minimum CO_2 rejection ratio (maximum CO_2 interference) as

measured by § 86.322 for CO analyzers shall be 5000:1.

(e) *Zero suppression.* Various techniques of zero suppression may be used to increase readability, but only with prior approval by the Administrator.

§ 86.317-79 Hydrocarbon analyzer specifications.

(a) Hydrocarbon measurements are to be made with a heated flame ionization detector (HFID) analyzer.

(b) *Option.* A non-heated flame ionization detector (FID) that measures hydrocarbon emissions on a dry basis is permitted for gasoline-fueled testing; *Provided,* That equivalency is demonstrated to the Administrator. With the exception of temperatures, all specifications contained in Subpart D apply to the optional system.

(c) The analyzer shall be fitted with a constant temperature oven housing the detector and sample-handling components. It shall maintain temperature with 2° C of the set point. The detector, oven, and sample-handling components within the oven shall be suitable for continuous operation at temperatures to 200° C.

(d) Fuel and burner air shall conform to the specifications in § 86.308.

(e) The percent of oxygen interference must be less than 3 percent, as specified in § 86.331(d)(7).

(f) Premixed burner air:

(1) For Diesel engines, premixing a small amount of air with the HFID fuel prior to combustion within the HFID burner is not recommended as a means of improving oxygen interference ($\%O_2I$). However, this procedure may be used if the engine manufacturer demonstrates on each basic combustion system (i.e., 4 cycle DI, 2 cycle DI, 4 cycle precup, etc.) that an HFID using this procedure produces comparable results to an HFID not using this procedure. These data must be submitted to the Administrator for his approval prior to testing.

(2) For gasoline-fueled engines, premixing burner air with the HFID fuel is not allowed.

§ 86.318-79 Oxides of nitrogen analyzer specifications.

(a) Oxides of nitrogen are to be measured with a chemiluminescense analyzer.

(1) The NO_x sample must be heated per § 86.309(a) and § 86.310(a) up to the NO_2 to NO converter.

(2) For high vacuum CL analyzers with heated capillary modules, supplying a heated sample to the capillary module is sufficient.

(3) The NO_2 to NO convertor efficiency shall be at least 90 percent.

(4) The quench interference must be less than 3.0 percent as measured in § 86.327.

(b) *Option.* The oxides of nitrogen may be measured with an NDIR analyzer system that meets the following specifications:

(1) The system shall include an NO_2 to NO converter, a water trap, and an NDIR analyzer in that order.

(2) The NO_2 to NO converter shall obtain a sample directly from the heated sample line.

(3) The water trap shall meet the specifications in § 86.311(e).

(4) The NO NDIR analyzer shall be calibrated per § 86.330.

(5) The minimum water rejection ratio (maximum water interference) for the NO NDIR analyzer shall be 5,000:1 (see § 86.321).

(6) The minimum CO_2 rejection ratio (maximum CO_2 interference) for the NO NDIR analyzer shall be 30,000:1 (see § 86.322).

§ 86.319-79 Analyzer checks and calibrations; frequency and overview.

(a) Prior to initial use and after major repairs, bench check each analyzer (see § 86.320).

(b) At least once every 7 days during testing, check the NO_x converter efficiency (see § 86.332).

(c) At least once every 30 days during testing, perform the following:

(1) Leak check the pressure side of the system (see § 86.328). If the option described in § 86.328(b)(2) is used, a pressure leak check is not required.

(2) Calibrate all analyzers (see §§ 86.330 through 86.332).

(3) Check the analysis system response time (see § 86.329). If the

option described in § 86.329(b) is used, a response time check is not required.

(4) Verify that the automatic data collection system (if used) meets the chart reading requirements found in § 86.343.

(5) Check the fuel flow measurement instrument to insure that the specifications in § 86.314 are met. Flow meters of the tapered tube and float design (rotometers) or the balance beam principle need be checked only every 90 days.

(d) At least once every 90 days during testing check the water rejection ratio and the CO_2 rejection ratio on all NDIR analyzers (see §§ 86.321 and 86.322).

(e) At least once every 180 days during testing check the dynamometer test stand and power output instrumentation (see § 86.333).

§ 86.320-79 Analyzer bench check.

(a) Prior to initial use and after major repairs verify that each analyzer complies with the following specifications:

(1) Response time (see § 86.315(a)).

(2) Precision (see § 86.315(b)).

(3) Noise (see § 86.315(c)).

(4) Zero drift (see § 86.315(d)).

(5) Span drift (see § 86.315(e)).

(6) Water rejection ratio, NDIR analyzers only (see §§ 86.316(c) and 86.318(b)(5).

(7) CO_2 rejection ratio, NDIR analyzers only (see §§ 86.316(d) and 86.318(b)(6)).

(8) Quench check, CL analyzers only (see § 86.327).

(b) If a stainless steel NO_2 to NO converter is used, condition all new or replacement converters. The conditioning consists of either purging the converter with air for a minimum of 4 hours or until the converter efficiency is greater than 90 percent. The converter must be at operational temperature while purging. Do not use this procedure prior to checking converter efficiency on in-use converters.

§ 86.321-79 NDIR water rejection ratio check.

(a) Zero and span the analyzer on the lowest range that will be used.

(b) Introduce a saturated mixture of water and zero gas at room temperature directly to the analyzer.

(c) Determine and record the analyzer operating pressure (GP) in absolute units in pascals. Gauges G3 and G4 may be used if the values are converted to the correct units.

(d) Determine and record the temperature of the zero-gas mixture.

(e) Record the analyzers' response (AR) in ppm to the saturated zero-gas mixture.

(f) For the temperature recorded in step (d), determine the saturation vapor presssure (P_{wB}) from § 86.344(d).

(g) Calculate the water concentration (Z) in the mixture from:

$$Z = (P_{wB}/GP)(10^6)$$

(h) Calculate the water rejection ratio (WRR) from:

$$WRR = (Z/AR)$$

§ 86.322-79 NDIR CO_2 rejection ratio check.

(a) Zero and span the analyzer on the lowest range that will be used.

(b) Introduce a CO_2 calibration gas of at least 10 percent CO_2 or greater to the analyzer.

(c) Record the CO_2 calibration gas concentration in *ppm*.

(d) Record the analyzers' response (AR) in *ppm* to the CO_2 calibration gas.

(e) Calculate the CO_2 rejection ratio (CO_2RR) from:

$$CO_2RR = (ppm\ CO_2)/AR$$

§ 86.323—§ 86.326 [Reserved]

§ 86.327-79 Quench checks; NO_x analyzer.

(a) Perform the reaction chamber quench check for each model of high vacuum reaction chamber analyzer prior to initial use.

(b) Perform the reaction chamber quench check for each new analyzer that has an ambient pressure or "soft vacuum" reaction chamber prior to initial use. Additionally, perform this check prior to reusing an analyzer of this type any time any repairs could potentially alter any flow rate into the reaction chamber. This includes, but is not limited to, sample capillary, ozone

capillary, and if used, dilution capillary.

(c) Quench check as follows:

(1) Calibrate the NO_x analyzer on the lowest range that will be used for testing.

(2) Introduce a mixture of CO_2 calibration gas and NO_x calibration gas to the CL analyzer. Dynamic blending may be used to provide this mixture. Dynamic blending may be accomplished by analyzing the CO_2 in the mixture. The change in the CO_2 value due to blending may then be used to determine the true concentration of the NO_x in the mixture. The CO_2 concentration of the mixture shall be approximately equal to the highest concentration experienced during testing. Record the response.

(3) Recheck the calibration. If it has changed more than ±1 percent of full scale, recalibrate and repeat the quench check.

(4) Prior to testing, the difference between the calculated NOx response and the response of NOx in the presence of CO_2 (step 2) must not be greater than 3.0 percent of full-scale. The calculated NOx response is based on the calibration performed in step (1).

(Secs. 206, 301(a) of the Clean Air Act as amended (42 U.S.C. 7525, 7601(a))

[42 FR 45154, Sept. 8, 1977, as amended at 44 FR 16917, Mar. 20, 1979]

§ 86.328-79 Leak checks.

(a) *Vacuum side leak check.* (1) Any location within the analysis system where a vacuum leak could affect the test results must be checked.

(2) The maximum allowable leakage rate on the vacuum side is 0.5 percent of the in-use flow rate for the portion of the system being checked. the analyzer flows and bypass flows may be used to estimate the in-use flow rates.

(3) The sample probe and the connection between the sample probe and valve V2 (Figure D79-1) may be excluded from the leak check.

(b) *Pressure side leak check.* (1) The maximum allowable leakage rate on the pressure side in 5 percent of the in-use flow rate.

(2) Option: If the flow rate for each flow meter is equal to or greater than the flow rate recorded in § 86.329(b)(1)(ii), then a pressure side leak check is not required.

§ 86.329-79 System response time; check procedure.

(a) Check the system response time by the following procedure:

(1) Stabilize the operating temperature of the sample line, sample pump, and heated filters.

(2) Introduce an HC span gas into the sampling system at the sample probe or valve V2 at atmospheric pressure. Simultaneously, start the time measurement.

(3) When the HC instrument response is 95 percent of the span gas concentration used, stop the time measurement.

(4) If the elapsed time is more than 20.0 seconds, make necessary adjustments.

(5) Repeat with the CO, CO_2, and NO_x instruments and span gases.

(b) Option. If the following parameters are determined, the initial system response time may be generally applied to future checks.

(1) Analyzer and bypass flow rates: (i) Determine by experimentation the minimum analyzer and bypass flow rates individually and in combination that will produce a response time as close as possible to 20.0 seconds per paragraph (a) of this section.

(ii) Record the highest minimum flow rate for each flow meter as determined in step (i).

(2) Capillary flow analyzers. This procedure is applicable only to analyzers that have sample capillaries such as the HFID and CL analyzers. It is also assumed that the system has sample/span valves that perform the function of valves V9 and V13 in Figure D79-1.

(i) Operate the analyzer(s) at the in-use capillary pressure.

(ii) Adjust the bypass flow rate to the flow rate recorded in paragraph (b)(1)(ii) of this section.

(iii) Measure and record the response time from the sample/span valve(s) per paragraph (a) of this section.

(iv) The response time (step (iii)) can be determined by switching from the "sample" position to the "span" posi-

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tion of the sample/span valve and observing the analyzer response on a chart recorder. Normally, the "sample" position would select a "room air" sample and the "span" position would select a span gas.

(v) Adjust the bypass flow rate to the normal in-use value.

(vi) Measure and record the response time from the sample/span valve(s) per paragraph (a) of this section.

(vii) Determine the slowest response time (step (iii) or step (iv)) and add 2 seconds to it.

§ 86.330-79 NDIR analyzer calibration.

(a) *Detector optimization.* If necessary, follow the manufacturer's instructions for initial start-up and basic operating adjustments.

(b) *Calibration curve.* Develop a calibration curve for each range used as follows:

(1) Zero the analyzer.

(2) Span the analyzer to give a response of approximately 90 percent of full-scale chart deflection.

(3) Recheck the zero response. If it has changed more than 0.5 percent of full scale, repeat steps (1) and (2).

(4) Record the response of calibration gases having nominal concentrations of 15, 30, 45, 60, 75, and 90 percent of full-scale concentration.

(5) Generate a calibration curve. The calibration curve shall be of fourth order or less, have five or fewer coefficients, and be of the form of equation (1) or (2). Include zero as a data point. Compensation for known impurities in the zero gas can be made to the zero-data point. The calibration curve must fit the data points within 2 percent of point or 1 percent of full scale, whichever is less.

$$y = Ax^4 + Bx^3 + Cx^2 + Dx + E \quad (1)$$

$$y = \frac{x}{Ax^4 + Bx^3 + Cx^2 + Dx + E} \quad (2)$$

where:
y = concentration
x = chart deflection

(6) *Option.* A new calibration curve need not be generated if: (i) A calibration curve conforming to step (5) exists; (ii) The responses generated in step (4) are within 1 percent of full scale or 2 percent of point, whichever is less, of the responses predicted by the calibration curve for the gases used in step (4).

(7) If multiple range analyzers are used, only the lowest range must meet the curve fit requirements below 15 percent of full scale.

(c) If any range is within 2 percent of being linear a linear calibration may be used. To determine if this criterion is met:

(1) Perform a linear least-square regression on the data generated. Use an equation of the form $y = mx$, where x is the actual chart deflection and y is the concentration.

(2) Use the equation $z = y/m$ to find the linear chart deflection (z) for each calibration gas concentration (y).

(3) Determine the linearity ($\%L$) for each calibration gas by:

$$\text{Percent } L = \frac{(z - x)}{\text{Full-scale linear chart deflection}} (100)$$

(4) The linearity criterion is met if the $\%L$ is less than ± 2 percent for each data point generated. For each emission test, a calibration curve of the form $Y = mx$ is to be used. The slope (m) is defined for each range by the spanning process.

[42 FR 45154, Sept. 8, 1977, as amended at 46 FR 50495, Oct. 13, 1981]

§ 86.331-79 Hydrocarbon analyzer calibration.

The following steps are followed in sequence to calibrate the hydrocarbon analyzer. It is suggested, but not required, that efforts be made to minimize relative response variations.

(a) If necessary, follow manufacturer's instructions for instrument start-up and basic operating adjustments.

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(b) Set the oven temperature 5°C hotter than the required sample-line temperature. Allow at least one-half hour after the oven has reached temperature for the system to equilibrate.

(c) Initial fuel flow adjustment. With the fuel and air-flow rates set at the manufacturer's recommendations, introduce a 350 ppmC ±75 ppmC span gas to the detector. Determine the response at a given fuel flow from the difference between the span-gas response and the zero-gas response. Incrementally adjust the fuel flow above and below the manufacturer's specification. Record the span and zero response at these fuel flows. A plot of the difference between the span and zero response versus fuel flow will be similar to the one shown in Fig. D79-3.

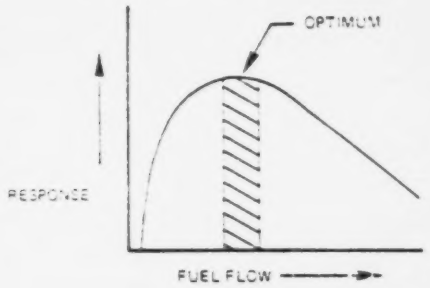

Figure D79-3 RESPONSE VS. FUEL FLOW

Adjust the fuel-flow rate to the rich side of the curve, as shown. This is initial flow-rate setting and may not be the final optimized flow rate.

(d) Oxygen interference optimization. Choose a range where the oxygen interference check gases (see § 86.308) will fall in the upper 50 percent. Conduct this test with the oven temperature set as required. Oxygen interference check gas specifications are found in § 86.308.

(1) Zero the analyzer.

(2) Span the analyzer with the zero-percent oxygen blend for gasoline-fueled engines. Diesel engine instruments shall be spanned with the 21-percent oxygen blend.

(3) Recheck zero response. If it has changed more than 0.5 percent of full scale repeat subparagraphs (1) and (2) of this paragraph.

(4) Introduce the 5 percent and 10 percent oxygen interference check gases.

(5) Recheck the zero response. If it has changed more ±1 percent of full scale, repeat the test.

(6) Calculate the percent of oxygen interference ($\%O_2I$) *for each mixture in step* (4).

$$\text{Percent } O_2I = \frac{B - \text{Analyser response } (ppmC)}{B}\ (100)$$

$$\text{Analyser response} = \frac{A}{\text{Percent of full-scale analyzer response due to } A} \times (\text{Percent of full-scale analyser response due to } B)$$

A = hydrocarbon concentration (*ppmC*) of the span gas used in step (2).

B = hydrocarbon concentration (*ppmC*) of the oxygen interference check gases used in step (4).

(7) The percent of oxygen interference ($\%O_2I$) must be less than ±3.0 percent for all required oxygen interference check gases prior to testing.

(8) If the oxygen interference is greater than the specifications, incrementally adjust the air flow above and below the manufacturer's specifications, repeating subparagraphs (1)

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through (7) of this paragraph for each flow.

(9) If the oxygen interference is greater than the specification after adjusting the air flow, vary the fuel flow and thereafter the sample flow, repeating subparagraphs (1) through (7) of this paragraph for each new setting.

(10) If the oxygen interference is still greater than the specifications, repair or replace the analyzer, FID fuel, or burner air prior to testing. Repeat this section with the repaired or replaced equipment or gases.

(e) Linearity check. For each range used, check linearity as follows:

(1) With the fuel flow, air flow and sample flow adjust to meet the oxygen interference specification, zero the analyzer.

(2) Span the analyzer using a calibration gas that will provide a response of approximately 90 percent of full-scale concentration.

(3) Recheck the zero response. If it has changed more than 0.5 percent of full scale, repeat steps (1) and (2).

(4) Record the response of calibration gases having nominal concentrations of 30, 60, and 90 percent of full-scale concentration. It is permitted to use additional concentrations.

(5) Perform a linear least square regression on the data generated. Use an equation of the form $y=mx$, where x is the actual chart deflection and y is the concentration.

(6) Use the equation $z=y/m$ to find the linear chart deflection (z) for each calibration gas concentration (y).

(7) Determine the linearity ($\%L$) for each calibration gas by:

$$\text{Percent } L = \frac{(z-x)}{\text{Full-scale linear chart deflection}} \times 100$$

(8) The linearity criterion is met if the $\%L$ is less than ± 2 percent for each data point generated. Below 40 *ppmC* the linearity criterion may be expanded to ± 4 percent. For each emission test, a calibration curve of the form $y=mx$ is to be used. The slope (m) is defined for each range by the spanning process.

(9) If the $\%L$ for any point exceeds the specifications in step (8), the air, fuel, and sample-flow rates may be varied within the boundaries of the oxygen interference specifications.

(10) If the $\%L$ for any data point still exceeds the specifications, repair or replace the analyzer, FID fuel, burner air, or calibration bottles prior to testing. Repeat the procedures of this section with the repaired or replaced equipment or gases.

(f) Optimized flow rates. The fuel-flow rate, air-flow rate and sample-flow rate are defined as "optimized" at this point.

§ 86.332-79 Oxides of nitrogen analyzer calibration.

(a) Perform a converter-efficiency check (see paragraph (b) of this section), every 7 days. Every 30 days perform a linearity check (see paragraph (c) of this section), which must be followed by a converter efficiency check. However, if the converter quick-check (see paragraphs (d) and (e) of this section) is performed every 7 days, the full converter efficiency check need only be performed every 30 days.

(b) *Converter-efficiency check.* The apparatus described and illustrated in Figure D79-4 is to be used to determine the conversion efficiency of devices that convert NO_2 to NO. The following procedure is to be used in determining the values to be used in the equation below:

(1) Follow the manufacturer's instructions for instrument startup and operation.

(2) Zero the oxides of nitrogen analyzer.

(3) Connect the outlet of the NO_x generator (see Figure D79-4) to the

sample inlet of the oxides of nitrogen analyzer which has been set to the most common operating range.

(4) Introduce into the NO_x generator-analyzer system a span gas with a NO concentration equal to approximately 80 percent of the most common operating range.

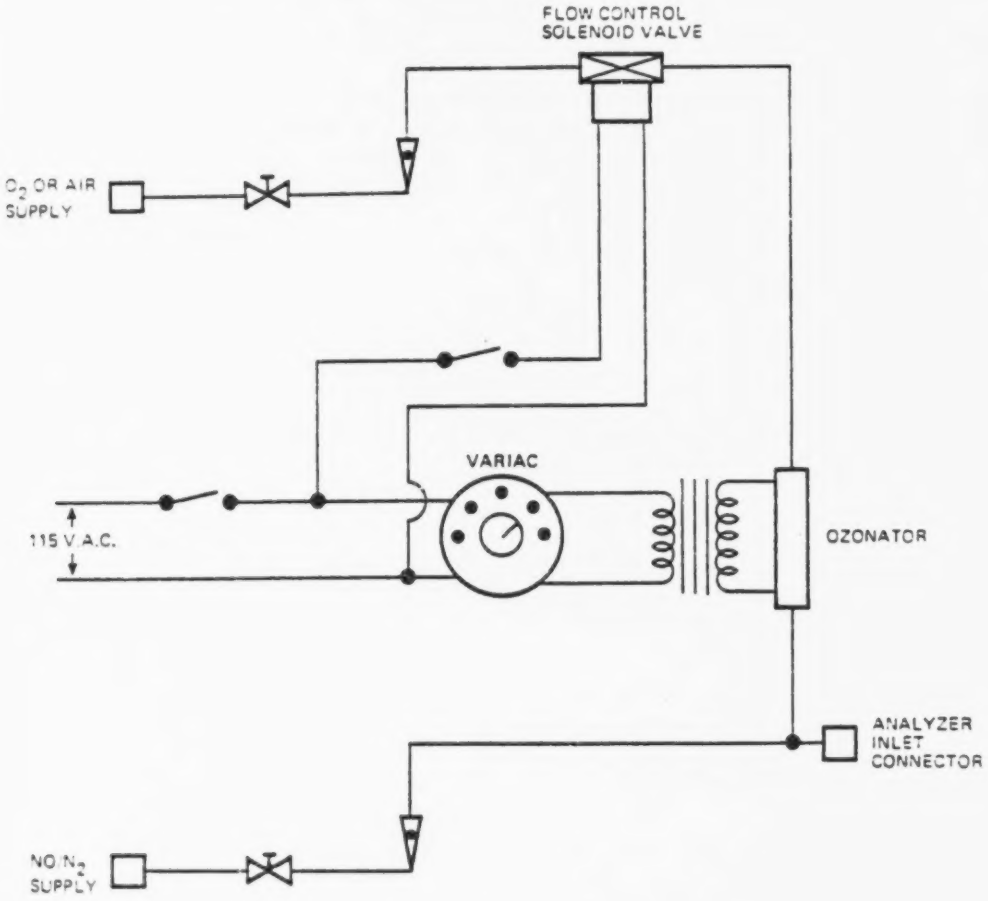

FIGURE D79-4 NO_x CONVERTER EFFICIENCY DETECTOR

(5) With the oxides of nitrogen analyzer in the NO Mode, record the concentration of NO indicated by the analyzer.

(6) Turn on the NO_x generator O_2 (or air) supply and adjust the O_2 (or air) flow rate so that the NO indicated by the analyzer is about 10 percent less than indicated in step (5). Record the concentration of NO in this $NO+O_2$ mixture.

(7) Switch the NO_x generator to the generation mode and adjust the generation rate so that the NO measured on the analyzer is 20 percent of that measured in step (5). There must be at least 10 percent unreacted NO at this point. Record the concentration of residual NO.

(8) Switch the oxides of nitrogen analyzer to the NO_x mode and measure total NO_x. Record this value.

(9) Switch off the NO_x generation, but maintain gas flow through the system. The oxides of nitrogen analyz-

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er will indicate the total NO_x in the $NO + O_2$ mixture. Record this value.

(10) Turn off the NO_x generator O_2 (or air) supply. The analyzer will now indicate the total NO_x in the original NO in N_2 mixture. This value should be no more than 5 percent above the value indicated in step (4).

(11) Calculate the efficiency of the NO_2 converter by substituting the concentrations obtained into the following equation:

$$\text{Percent efficient} = 1 + \frac{a-b}{c-d} \times 100$$

The efficiency of the converter shall be greater than 90 percent. Adjustment of the converter temperature may be necessary to maximize the efficiency. If the converter does not meet the conversion-efficiency specifications, repair or replace the unit prior to testing. Repeat the procedures of this section with the repaired or new converter.

(c) *Linearity check.* For each range used, check linearity as follows:

(1) With the operating parameters adjusted to meet the converter efficiency check and the quench checks, zero the analyzer.

(2) Span the analyzer using a calibration gas that will give a response of approximately 90 percent of full-scale concentration.

(3) Recheck the zero response. If it has changed more than 0.5 percent of full scale, repeat steps (1) and (2).

(4) Record the response of calibration gases having nominal concentrations of 30, 60 and 90 percent of full-scale concentration. It is permitted to use additional concentrations.

(5) Perform a linear least-square regression on the data generated. Use an equation of the form $y = mx$ where x is the actual chart deflection and y is the concentration.

(6) Use the equation $z = y/m$ to find the linear chart deflection (z) for each calibration gas concentration (y).

(7) Determine the linearity ($\%L$) for each calibration gas by:

$$\text{Percent } L = \frac{(z-x)}{\text{Full-scale linear chart deflection}} (100)$$

(8) The linearity criterion is met if the $\%L$ is less than ± 2 percent of each data point generated. For each emission test, a calibration curve of the form $y = mx$ is to be used. The slope (m) is defined for each range by the spanning process.

(9) If the $\%L$ exceeds ± 2 percent for any data point generated, repair or replace the analyzer or calibration bottles prior to testing. Repeat the procedures of this section with the repaired or replaced equipment or gases.

(10) Perform a converter-efficiency check (see paragraph (b) of this section).

(11) The operating parameters are defined as "optimized" at this point.

(d) *Converter checking gas.* If the converter quick-check procedure is to be employed, paragraph (e) of this section, a converter checking gas bottle must be named. The following naming procedure must occur after each converter efficiency check, paragraph (b) of this section.

(1) A gas bottle with an NO_2 concentration equal to approximately 80 percent of the most common operation range shall be designated as the converter checking gas bottle. Its NO concentration shall be less than 25 percent of its NO_2 concentration, on a volume basis.

(2) On the most common operating range, zero and span the analyzer in the NO_x mode. Use a calibration gas with a concentration equal to approximately 80 percent of the range for spanning.

(3) Introduce the converter checking gas. Analyze and record concentrations in both the NO_x mode (X) and NO mode (Y).

(4) Calculate the concentration of the converter checking gas using the results from step (3) and the converter efficiency from paragraph (b) as follows.

$$\text{Concentration} = \frac{(X-Y) \times 100}{\text{Efficiency}} + Y$$

(e) *Converter quick-check.* (1) Span the analyzer in the normal manner (NO_x mode) for the most common operating range.

(2) Analyze the converter checking gas in the NO_x mode, record the concentration.

(3) Compare the observed concentration with the concentration assigned under the procedure in paragraph (d) of this section. If the observed concentration is equal to or greater than 90 percent of the assigned concentration, the converter operation is satisfactory.

[42 FR 45154, Sept. 8, 1977, as amended at 46 FR 50495, Oct. 13, 1981]

§ 86.333–79 Dynamometer calibration.

(a) If necessary, follow the manufacturer's instructions for initial start-up and basic operating adjustments.

(b) Check the dynamometer torque measurement for each range used by the following:

(1) Warm up the dynamometer following the equipment manufacturer's specifications.

(2) Determine the dynamometer calibration moment arm. Equipment manufacturer's data, actual measurement, or the value recorded from the previous calibration used for this subpart may be used.

(3) Calculate the indicated torque (*IT*) for each calibration weight to be used by:

IT=calibration weight (lb) x calibration moment arm (ft)

(4) Attach each calibration weight specified in § 86.312 to the moment arm at the calibration distance determined in step (2). Record the power measurement equipment response (ft-lb) to each weight.

(5) For each calibration weight, compare the torque value measured in step (4) to the calculated torque determined in step (3).

(6) The measured torque must be within 2 percent of the calculated torque.

(7) If the measured torque is not within 2 percent of the calculated torque, adjust or repair the system. Repeat steps (1) through (6) with the adjusted or repaired system.

(c) *Option.* A master load-cell or transfer standard may be used to verify the in-use torque measurement system.

(1) The master load-cell and read out system must be calibrated with weights at each test weight specified in § 86.312–79. The calibration weights must be traceable to within 0.1 percent of NBS weights.

(2) Warm up the dynamometer following the equipment manufacturer's specifications.

(3) Attach the master load-cell and loading system.

(4) Load the dynamometer to a minimum of 6 equally spaced torque values as indicated by the master load-cell for each in-use range used.

(5) The in-use torque measurement must be within 2 percent of the torque measured by the master system for each load used.

(6) If the in-use torque is not within 2 percent of the master torque, adjust or repair the system. Repeat step (2) through step (5) with the adjusted or repaired system.

(d) The dynamometer calibration must be completed within 2 hours from the completion of the dynamometer warm-up.

§ 86.334–79 Test procedure overview.

(a) The test consists of prescribed sequences of engine operating conditions to be conducted on an engine dynamometer. The exhaust gases generated during engine operation are sampled for specific component analysis through the analytical train. The test is applicable to engines equipped with catalytic or direct-flame afterburners, induction system modifications, or other systems, or to uncontrolled engines.

(b) The tests are designed to determine the brake-specific emissions of

hydrocarbons, carbon monoxide, and oxides of nitrogen. The gasoline-fueled engine test consists of 1 warm-up cycle and 1 hot cycle. The Diesel engine test consists of 3 idle modes and 5 power modes at each of 2 speeds which span the typical operating range of Diesel engines. These procedures require the determination of the concentration of each pollutant, the fuel flow and the power output during each mode. The measured values are weighted and used to calculate the grams of each pollutant emitted per brake-horsepower hour.

(c)(1) When an engine is tested for exhaust emissions or is operated for service accumulation on an engine dynamometer, the complete engine shall be tested, with all emission control devices installed and functioning.

(2) Evaporative emission controls need not be connected if data are provided to show that normal operating conditions are maintained in the engine induction system.

(3) On air cooled engines, the fan shall be installed.

(4) Additional accessories (e.g., oil cooler, alternators, air compressors, etc.) may be installed with advance approval by the Administrator.

(d) All emission control systems installed on or incorporated in a new motor vehicle engine shall be functioning during all procedures in this subpart. In cases of component malfunction or failure, maintenance to correct component failure or malfunction shall be authorized in accordance with § 86.079-25.

§ 86.335-79 Gasoline-fueled engine test cycle.

(a) The following test sequence shall be followed in dynamometer operation tests of gasoline-fueled heavy-duty engines. Diesel engines are covered in § 86.336.

Cycle No	Mode No	Mode	Observed torque (percent of maximum observed)	Time in mode-seconds	Cumulative time-seconds	Weighting factors
1	1	Idle		60	60	0.232
1	2	Cruise	25	60	120	.077
1	3	PTA	55	60	180	.147
1	4	Cruise	25	60	240	.077
1	5	PTD	10	60	300	.057
1	6	Cruise	25	60	360	.077
1	7	FL	90	60	420	.113
1	8	Cruise	25	60	480	.077
1	9	CT		60	540	.143
2	10	Cruise	25	60	600	.077
2	11	PTA	55	60	660	.147
2	12	Cruise	25	60	720	.077
2	13	PTD	10	60	780	.057
2	14	Cruise	25	60	840	.077
2	15	FL	90	60	900	.113
2	16	Cruise	25	60	960	.077
2	17	CT		60	1,020	.143
2	18	Idle		60	1,080	.232

(b) Except for idles, the engine dynamometer shall be operated at a constant speed of 2000 rpm±100 rpm. Speed deviations, not to exceed 200 rpm, will be allowed during the first 10 seconds of each mode.

(c) The times in-mode specified in paragraph (a) for the CT modes are ±2 seconds. All other times in-mode are ±4 seconds.

(d) Torque for each mode must be held at the specified value ±2 percent of the maximum torque observed except for the first 35 seconds of each mode. For example, mode 3 torque shall be held between 53 and 57 percent of maximum torque (55 ±2%).

(e) The idle operating mode shall be carried out at the manufacturer's recommended curb-idle engine speed. Arrive at the last idle mode by closing the throttle, braking the dynamometer to the engine idle speed, and unloading the dynamometer.

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(f) The CT operating mode shall be carried out at the same engine speed as specified in paragraph (b) of this section.

(g) If the Administrator determines that an engine shall be tested as an automatic transmission code engine, then a load shall be applied by the dynamometer during the idle modes (1 and 18) such that the engine speed is decreased from the recommended dynamometer-idle speed to the recommended curb-idle speed. The engine idle torque recorded for the calculations in § 86.345 shall be zero.

(h) If the operating conditions specified in paragraph (a) of this section for modes 2 through 8, and 10 through 16 cannot be maintained, the Administrator may authorize deviations from the specified load conditions. Such deviations shall not exceed 5 percent of the maximum torque at the test speed. The minimum deviations, above and below the specified load, necessary for stable operation shall be determined by the manufacturer and approved by the Administrator prior to the test run. Emission tests shall be performed by operating the engine at the higher approved load setting during cycle 1 and at the lower approved load setting during cycle 2. The weighting factors shall be as specified in paragraph (a) of this section.

(Secs. 206, 301(a) of the Clean Air Act as amended (42 U.S.C. 7525, 7601(a))

[42 FR 45154, Sept. 8, 1977, as amended at 44 FR 16917, Mar. 20, 1979]

§ 86.336-79 Diesel engine test cycle.

(a) The following 13-mode cycle shall be followed in dynamometer operation tests of heavy-duty Diesel engines. Gasoline-fueled engines are covered in § 86.335.

Test Segment	Mode No.	Engine Speed	Observed torque (percent of maximum observed)	Time in mode (minutes)		Maximum cumulative time (minutes)
				Minimum	Maximum	
1	1	Curb-idle		4.5	6.0	
1	2	Intermediate	2	4.5	6.0	
1	3	do	25	4.5	6.0	
1	4	do	50	4.5	6.0	42
1	5	do	75	4.5	6.0	
1	6	do	100	4.5	6.0	
1	7	Curb-idle		4.5	6.0	
2	8	Rated	100	4.5	6.0	
2	9	do	75	4.5	6.0	
2	10	do	50	4.5	6.0	36
2	11	do	25	4.5	6.0	
2	12	do	2	4.5	6.0	
2	13	Curb-idle		4.5	6.0	

(b) During each mode the specified speed shall be held to within 50 rpm. Torque for each mode must be held at the specified value ±2 percent of the maximum torque observed. For example, mode 4 torque shall be held between 48 and 52 percent of maximum torque (50 ±2%).

(c) If the operating conditions specified in paragraph (b) of this section for modes 3, 4, 5, 9, 10, and 11 cannot be maintained, the Administrator may authorize deviations from the specified load conditions. Such deviations shall not exceed 10 percent of the maximum torque at the test speed. The minimum deviations, above and below the specified load, necessary for stable operation shall be determined by the manufacturer and approved by the Administrator prior to the test run. Emission tests shall be performed at each of the approved load settings, one above and one below the operating conditions specified in paragraph (a) of this section. The emission values obtained shall be calculated in accordance with § 86.345 except that the weighting factor shall be 0.04.

(d) If the Administrator determines that an engine shall be tested as an automatic transmission code engine, then a load shall be applied by the dynamometer during the idle modes

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(1, 7, and 13) such that the engine speed is decreased from the recommended dynamometer-idle speed to the recommended curb-idle speed. The engine-idle torque recorded for the calculations in § 86.345 shall be zero.

§ 86.337-79 Information.

The following information, as applicable, shall be recorded for each test:

(a) *Engine description and specification.* A copy of the information specified in this paragraph must accompany each engine sent to the Administrator for compliance testing. The manufacturer need not record the information specified in this paragraph for each test if the information, with the exception of subparagraphs (3), (12), and (13), is included in the manufacturer's Part I.

(1) Engine-system combination.

(2) Engine identification numbers.

(3) Number of hours of operation accumulated on engine.

(4) Rated maximum horsepower and torque.

(5) Maximum horsepower and torque speeds.

(6) Engine displacement.

(7) Governed speed.

(8) Manufacturer's start-up and warm-up reference, (gasoline-fueled engines only).

(9) Curb-idle rpm.

(10) Dynamometer-idle rpm (automatic transmission code engines only).

(11) Maximum horsepower at 2000 rpm (gasoline-fueled engines only).

(12) Fuel consumption and maximum torque at 2000 rpm (gasoline-fueled engines only).

(13) Fuel consumption at maximum power and torque (Diesel engines only).

(14) Maximum air flow (Diesel engines only).

(15) Air inlet restriction (Diesel engines only).

(16) Exhaust pipe diameter(s) (Diesel engines only).

(17) Maximum exhaust system back pressure (Diesel engines only).

(18) Maximum exhaust system back pressure at 2000 rpm, if applicable (gasoline-fueled engines only).

(b) *Test data; general.* This information may be recorded at any time between 4 hours prior to the test and 4 hours after the test.

(1) Engine-system combination.

(2) Engine identification number.

(3) Instrument operator.

(4) Engine operator.

(5) Number of hours of operation accumulated on the engine prior to beginning the warm-up portion of the test.

(6) Fuel identification.

(7) Date of most recent analytical assembly calibration.

(8) All pertinent instrument information such as tuning, gain, serial numbers, detector number, calibration curve numbers, etc. As long as this information is traceable, it may be summarized by system number or analyzer identification numbers.

(c) *Test data; pre-test.* (1) Date and time of day.

(2) Test number.

(3) Ambient temperature in dynamometer testing room (gasoline-fueled engines only).

(4) Barometric pressure, pre-test for gasoline-fueled engines, pre-test segment for Diesel engines.

(5) Engine intake humidity, pre-test for gasoline-fueled engines, pre-test segment for Diesel engines with nonconditioned air supply systems.

(6) Maximum observed torque for intermediate and rated speeds (Diesel engines only).

(7) Maximum observed torque at 2000 rpm (gasoline-fueled engines only).

(8) Recorder chart or equivalent. Identify for each test (test segment for Diesel engines) zero traces for each range used, and span traces for each range used.

(d) *Test data; modal.* (1) Recorder chart or equivalent. Identify for each test mode the emission concentration traces and the associated analyzer range(s). The start and finish of each test.

(2) Observed engine torque.

(3) Observed engine rpm.

(4) Record engine torque and engine rpm continuously with a chart recorder or equivalent recording device.

(5) Intake air flow and depression for each mode (Diesel engines only).

(6) Engine intake air temperature for each mode (Diesel engines only).

(7) Fuel flow for each mode. If the fuel flow measurement is a volume measurement system, record the fuel temperature in the measurement system for fuel density corrections to the mass flow rate. If the fuel temperature is within 3° C (5.4° F) of the calibration temperature, no density correction is required.

(8) Engine intake humidity (only for Diesel engines with humidity conditioned air supply).

(e) *Test data: post-test.* (1) Recorder chart or equivalent. Identify the hang-up check.

(2) Recorder chart or equivalent. Identify the zero traces for each range used and the span traces for each range used.

(3) Ambient temperature in the dynamometer testing room (gasoline-fueled engines only).

(4) Total number of hours of operation accumulated on the engine.

[42 FR 45154, Sept. 8, 1977, as amended at 46 FR 50495, Oct. 13, 1981]

§ 86.338-79 Exhaust measurement accuracy.

(a) The analyzers must be operated between 15 percent and 100 percent of full-scale chart deflection during the measurement of the emissions for each mode. The exceptions to the lower limit of this operating rule are:

(1) The analyzer's response may be less than 15 percent of full-scale if the full-scale value is 155 ppm (or ppm C) or less.

(2) *Option.* For CO analysis the analyzer's response may be less than 15 percent of full scale if the full-scale value is 5500 ppm or less.

(3) The analyzer's response may be less than 15 percent of full scale if the emissions from the engine are erratic and the average chart-deflection value is greater than 15 percent of full scale.

(4) For gasoline-fueled engines, the analyzer's response may be less than 15 percent of full scale during the initial part of the CT mode provided that average chart-deflection value is greater than 15 percent of full scale.

(5) The analyzer's response may be less than 15 percent of full scale if the contribution of all modes read below the 15 percent level is less than 10 percent by mass of the final test results.

(6) The HC analyzer's response may be less than 15 percent of full-scale when transient emissions (spikes) can be reasonably expected to exceed 90 percent of full-scale. Higher analyzer ranges may be used provided that the precision and linearity of the anlyzer at the level of the readings below 15 percent meets the specifications of the range that would be required if the transient emissions did not exist.

(Secs. 206, 301(a) of the Clean Air Act as amended (42 U.S.C. 7525, 7601(a))

[42 FR 45154, Sept. 8, 1977, as amended at 44 FR 16917, Mar. 20, 1979; 46 FR 50495, Oct. 13, 1981]

§ 86.339-79 Pre-test procedures.

(a) Allow a minimum of 30 minutes warm-up in the stand-by or operating mode prior to spanning the analyzers.

(b) Replace or clean the filter elements and then vacuum leak check the system, § 86.328(a). A pressure leak check is also permitted per § 86.328(b). Allow the heated sample line, filters, and pumps to reach operating temperature.

(c) Perform the following system checks:

(1) If a stainless steel NO_2 to NO converter is used, prior to gasoline-fueled engine tests, purge the converter with air (zero-grade air, room air, or O_2) for a minimum of 30 minutes. The converter must be at operational temperature while purging.

(2) Check the sample-line temperature (see § 86.310).

(3) Check the system response time (see § 86.329). System response time may be applied from the most recent check of response time if all of the following are met:

(i) The flow rate for each flow meter is equal to or greater than the flow rate recorded in § 86.329(b)(1)(ii).

(ii) For analyzers with capillaries, the response time from the sample/span valve is measured using in-use pressures and bypass flows (see § 86.329(b)(2)).

(iii) The response time measured in step (ii) is equal to or less than the response time determined in § 86.329(b)(2)(vii).

(4) A hang-up check is permitted.

(5) A converter-efficiency check is permitted. The check need not conform to § 86.332(b). The test procedure may be aborted at this point in the procedure in order to repair the NO_2 to NO converter. If the test is aborted, the converter must pass the efficiency check described in § 86.332(b) prior to starting the dynamometer test run.

(d) Introduce the zero-grade gases at the same flow rates and pressures used to calibrate the analyzers and zero the analyzers on the lowest anticipated range that will be used during the test. Immediately prior to each test (segment, for Diesel engines), obtain a stable zero for each anticipated range that will be used during the test.

(e) Introduce span gases to the instruments under the same flow conditions as were used for the zero gases. Adjust the instrument gains on the lowest range that will be used to give the desired value. Span gases should have a concentration greater than 70 percent of full scale for each range used. Immediately prior to each test and also prior to each segment of the Diesel test, record the response to the span gas and the span-gas concentration for each range that will be used during the test.

(f) Check the zero responses. If they have changed more than 0.5 percent of full scale, repeat paragraphs (d) and (e) of this section.

(g) Check system flow rates and pressures. Note the values of gauges G3 and G4 for reference during the test.

§ 86.340-79 Gasoline-fueled engine dynamometer test run.

(a) This section applies to gasoline-fueled engines only. Diesel engines are covered in § 86.341.

(b) (1) Mount test engine on the engine dynamometer.

(2) Install instrumentation and sample probe.

(3) Read and record the general test data as specified in § 86.337(b).

(c) Precondition the engine by the following continuous steps:

(1) The engine shall be started and operated at:

(i) Zero load in accordance with the manufacturer's start-up and warm-up procedures for 1 minute + 30 sec;

(ii) A torque equivalent to 10±3 percent of the most recent determination of maximum torque for 4 minutes ±30 second at 2,000 rpm. This torque level may be exceeded if the choke and fast idle cam mechanism would normally result in a stabilized idle speed in excess of 2,000 rpm.

(iii) A torque equivalent to 55±5 percent of the most recent determination of maximum torque for 35 minutes ±1 minute at 2000 rpm;

(iv) Option. If the engine has been operating on service accumulation for a minimum of 40 minutes, the service accumulation may be substituted for steps (i) through (iii).

(2) If tested under the provisions of § 86.079-29, check specifications as required. This check must be performed within 20 minutes after completion of engine preconditioning;

(3) Determine the maximum torque of the engine at 2000 rpm ±100 rpm;

(i) Operate the engine with the throttle fully opened for a maximum of three minutes. During the second minute of operation, record the high and low torque readings. The average of these two readings will be the maximum torque value at 2000 rpm.

(ii) Calculate the torque corresponding to 10, 25, 55, and 90 percent of the observed maximum torque value.

(4) Determine the analyzer ranges required for each mode specified in § 86.335 to meet the range specifications of § 86.338. Prior to determining the range selection, the automatic dynamometer controller, if used, may be calibrated for the prevailing ambient conditions. The engine must not be operated for more than 20 minutes. Cycle 1, or cycles 1 and 2, specified in § 86.335, may be used for this purpose;

(5) The engine shall be turned off and allowed to stand for at least 1 hour, but not more than 2 hours, at an average ambient temperature of 25° C±5° C (77° F±9° F).

(d) The following steps shall be taken for each test:

(1) Maintain dynamometer test cell average ambient temperature at 25° C±5° C (77° F±9° F);

(2) Observe pre-test procedures; § 86.339;

(3) Start cooling system;

(4) Start engine and operate in accordance with manufacturer's start-up and warm-up procedures. The duration of the warm-up procedures shall be 5 minutes ±30 seconds. Sample flow may begin during the warm-up;

(5) Read and record all pre-test data specified in § 86.337(c) during the 5 minute warm-up;

(6) Release the choke idle-stop (if necessary) and return the engine throttle control to the curb-idle position, start sample flow and recorders if not already started, and begin test sequence of § 86.335;

(7) Should it be determined that the test must be rerun, then only the soak specified in paragraph (c)(5) of this section need be performed prior to paragraph (d) of this section;

(8) Perform the test cycle, § 86.335, and continuously record exhaust gas concentrations;

(9) Read and record all modal data specified in § 86.337(d) during the test cycle;

(10) The engine speed and load must be maintained within the requirements of § 86.343;

(11) If at any time during a test, the test equipment malfunctions or the specifications in paragraph (d)(10) of this section are not met, the test is void, and may be aborted. The test sequence may be restarted under the provisions of paragraph (c)(5) of this section.

(e) *Exhaust gas measurements.* (1) Measure HC, CO, CO_2, and NO_x volume concentration in the exhaust sample. Should the analyzer response exceed 100 percent of full scale or respond less than 15 percent of the full scale, the next higher or lower analyzer range shall be used per § 86.338. For exceptions to the lower limit see § 86.338. Should the fuel flow instrument read below 20 percent of the full-scale value, a flow measurement unit with a lower scale must be used unless the option in § 86.314 is desired.

(2) For each analyzer, each range that may be used during a test must have the zero and span responses recorded prior to the execution of that test. Only the range(s) used to measure the emissions during a test are required to have their zero and span recorded after the completion of the test.

(3) If during an emission test the value of gauges downstream of the NDIR analyzer(s) (G3 or G4) differs by more than ±2 inches of water from the pretest value, the test is void.

(Secs. 206, 301(a) of the Clean Air Act as amended (42 U.S.C. 7525, 7601(a))

[42 FR 45154, Sept. 8, 1977, as amended at 44 FR 16917, Mar. 20, 1979; 46 FR 50496, Oct. 13, 1981]

§ 86.341-79 Diesel engine dynamometer test run.

(a) This section applies to Diesel engines only. Gasoline-fueled engines are covered in § 86.340.

(b) The temperature of the air supplied to the engine shall be between 68°F and 86°F. The fuel temperature at the pump inlet shall be 100°F±10°F. The observed barometric pressure shall be between 28.5 inches and 31 inches Hg. Higher air temperature or lower barometric pressure may be used, if desired, but no allowance shall be made for increased emissions because of such conditions unless correction factors are developed and approved in advance by the Administrator.

(c) The governor and fuel system shall have been adjusted to provide engine performance at the levels in the application for certification required under § 86.079-21. These adjustments are only permitted under the provisions of § 86.079-25.

(d) The following steps shall be taken for each test:

(1) Install instrumentation and sample probes as required;

(2) Observe pre-test procedure, § 86.339; (3) Read and record the general test data as specified in § 86.337(b);

(3) Read and record the general test data as specified in § 86.337(b);

(4) Start cooling system;

(5) Precondition the engine in the following manner:

(i) Operate the engine at idle for 2 to 3 minutes;

(ii) Operate the engine at approximately 50 percent power at the peak torque speed for 5 to 7 minutes;

(iii) Operate the engine at rated speed and maximum horsepower for 25 to 30 minutes;

(iv) *Option.* It is permitted to precondition the engine at rated speed and maximum horsepower until the oil and water temperatures are stabilized. The temperatures are defined as stabilized if they are maintained within 2 percent of point for 2 minutes. The engine must be operated a minimum of 10 minutes for this option. This optional procedure may be substituted for step (iii);

(v) *Option.* If the engine has been operating on service accumulation for a minimum of 40 minutes, the service accumulation may be substituted for steps (i) through (iii);

(vi) Longer preconditioning times may be used only if prior approval is obtained from the Administrator.

(6) Within a total elapsed time of 10 minutes or less, determine by experimentation the maximum torque at the rated and intermediate speeds;

(7) Calculate the torque corresponding to 2, 25, 50, 75, and 100 percent of the maximum observed torque for the rated and intermediate speeds;

(8) Read and record all pre-test data specified in § 86.337(c);

(9) Start the test cycle, § 86.336, within 10 minutes, after determining test load using the torque values determined in paragraph (d)(6) of this section;

(10) Read and record all modal data specified in § 86.337(d) during the last 2 minutes of each mode;

(11) Continuously record the analyzer's response to the exhaust gas during each test segment;

(12) Test segments may be repeated;

(13) If a delay of more than 20 minutes occurs between the end of one segment and the beginning of another segment the test is void. The test may be restarted at paragraph (d)(8) of this section. If the delay exceeds 4 hours, the test shall be restarted at paragraph (d) (2) of this section;

(14) The engine speed and load must be maintained within the requirements of § 86.336 during the last 2 minutes of each mode. If the requirement is not met for all modes during a test segment, that segment of the test is void. The test segment may be restarted beginning with paragraph (d)(8) of this section;

(15) If at any time during a test segment, the test equipment malfunctions or the specifications in paragraph (d)(14) of this section are not met, the test segment is void, and may be aborted. The test segment may be restarted beginning with paragraph (d)(8) of this section;

(16) Fuel flow and air flow during the idle or 2-percent load conditions may be determined just prior to or immediately following the dynamometer sequence, if longer times are required for accurate measurements.

(e) *Exhaust gas measurements.* (1) Measure HC, CO, CO_2, and NO_x volume concentration in the exhaust sample. Should the analyzer response exceed 100 percent of full scale or respond less than 15 percent of full scale, the next higher or lower analyzer range shall be used per § 86.338. For exceptions to the lower limit see § 86.338. Should the fuel flow instrument read below 20 percent of full-scale value, a smaller flow measurement unit must be used unless the option in § 86.314 is desired.

(2) Each analyzer range that may be used during a test segment must have the zero and span responses recorded prior to the execution of that test segment. Only the range(s) used to measure the emissions during a test segment are required to have their zero and span recorded after the completion of the test segment.

(3) It is permitted to change filter elements between test segments.

(4) A leak check is permitted between test segments.

(5) A hang-up check is permitted between test segments.

(6) If, during the emission measurement portion of a test segment, the value of the gauges downstream of the NDIR analyzer(s) G3 or G4 differs by more than ±2 inches of water from the pretest value, the test segment is void.

[42 FR 45154, Sept. 8, 1977, as amended at 46 FR 50496, Oct. 13, 1981]

§ 86.342-79 Post-test procedures.

(a) Begin a hang-up check within 30 seconds of the completion of the last

mode in the test. Use the following procedure:

(1) Introduce a zero-grade gas or room air into the sample probe or valve V2 to check the "hangup zero" response. Simultaneously start a time measurement.

(2) Select the lowest HC range used during the test;

(3) The difference between the span-zero response and the hang-up zero response shall not be greater than 5.0 percent of full scale or 10 ppmC whichever is greater, within:

(i) 50 seconds for gasoline-fueled engine test, or

(ii) 4 minutes for Diesel engine tests, or

(b) Begin the analyzer span checks within 6 minutes after the completion of the last mode in the test. Record for each analyzer the zero and span response for each range used during the preceding test or test segment.

(c) If during the test, the filter element(s) were replaced or cleaned, a vacuum check must be performed per § 86.328 immediately after the span checks. If the vacuum side leak check does not meet the requirements of § 86.328 the test is void.

(d) Read and record the post-test data specified in § 86.337(e).

(e) For a valid test, the analyzer drift between the before-test and after-test (before-segment and after-segment for Diesels) span checks for each analyzer must meet the following requirements:

(1) The span drift (defined as the change in the difference between the zero response and the span response) must not exceed 2.0 percent of full-scale chart deflection for each range used;

(2) The zero response drift must not exceed 2.0 percent of full-scale chart deflection for each range used above 155 ppm (or ppm C), or 3 percent of full-scale chart deflection for each range below 155 ppm (or ppm C).

(Secs. 206, 301(a) of the Clean Air Act as amended (42 U.S.C. 7525, 7601(a))

[42 FR 45154, Sept. 8, 1977, as amended at 44 FR 16917, Mar. 20, 1979; 46 FR 50496, Oct. 13, 1981]

§ 86.343-79 Chart reading.

(a) A computer or any other automatic data processing device(s) may be used as long as the system meets the requirements of this subpart.

(b) Determine the location on the chart of the analyzer responses corresponding to the end of each mode.

(c) For gasoline-fueled engines, determine whether the test cycle was run in accordance with § 86.335 by observing either chart event marks, speed trace, torque trace, or concentration traces. The test will be invalidated if there is a deviation of more than:

(1) 2 seconds from the specified time for each CT mode, and 4 seconds for all other modes; or,

(2) 2 percent of maximum torque during each mode excluding the first 20 seconds of each mode; or,

(3) 200 rpm during the first 10 seconds of each mode, or 100 rpm during the remainder of each mode.

(d) Determine chart deflections.

(1) Locate the last 10 seconds of each gasoline-fueled engine mode except CT. Locate the last 50 seconds of each gasoline-fueled engine CT mode. For all Diesel engine modes locate the last 60 seconds.

(2)(i) Divide the last 10 seconds or 60 seconds, whichever is applicable, into a minimum of 10 equally spaced increments. Determine the chart deflection of each increment for the CO_2, CO, HC, and NO_x analyzers.

(ii) Option for Diesel engine modes. If the deviation from a straight line (other than instrument noise) during this 60 seconds is less than ±5 percent of full-scale, the average chart deflection may be determined by eye. The average value (one number) may then be used in lieu of the 10 values required by paragraph (d)(2)(i) of this section.

(3) Other methods of determining the chart deflection of the analyzers may be used only with prior approval by the Administrator.

(e) Determine CO_2, CO, HC, and NO_x concentrations for each mode.

(1) If the option in paragraph (d)(2)(ii) of this section is employed, then those chart deflections for both linear and non-linear analyzers may be

substituted for the average chart deflection in step (e)(2).

(2) For linear instruments, average the chart deflections determined in paragraph (d)(2)(i) of this section. Determine the concentration for this average chart deflection using calibration data.

(3) For non-linear instruments, calculate concentrations for each chart deflection determined in paragraph (d)(2)(i) of this section. Take the average of these concentrations for each mode.

(4) For purposes of this paragraph, calibration data includes calibration curves, linearity curves, span-gas responses, and zero-gas responses.

§ 86.344-79 Humidity calculations.

(a) The following abbreviations (and units) are used in this section:

$BARO$ barometric pressure (Pa)
H specific humidity, (gm H_2O/gm of dry air)
K 0.6220 gm H_2O/gm dry air
M_{air} Molecular weight of air = 28.9645
M_{H2O} Molecular weight of water = 18.01534
P_{DB} Saturation vapor pressure of water at the dry bulb temperature (Pa)
P_{DP} saturation vapor pressure of water at the dewpoint temperature (Pa)
P_v partial pressure of water vapor (Pa)
P_{WB} saturation vapor pressure of water at the wet bulb temperature (pa)
T_{DB} Dry bulb temperature (°K)
T_{WB} Wet bulb temperature (°K)
Y Water-vapor volume concentration

(b) The specific humidity on a dry basis of the intake air (H) is defined by equation (1).

$$H = \frac{(K)(Pv)}{BARO - Pv} \qquad (1)$$

(c) The partial pressure of water vapor may be determined in two manners:

(1) A dew point device may be used. In that case:

$$P_v = P_{DP}$$

(2) A wet-bulb, dry-bulb method may be used. In that case "Ferrels equation" (eq. (2)) is used.

$$Pv = P_{WB} - 0.000660\ (T_{DB} - T_{WB})\ BARO\ [1 + 0.00115\ (T_{WB} - 273.15)] \qquad (2)$$

(d) (1) The saturation vapor pressure (P_{WB}) of water at the wet-bulb temperature is defined by equation (3) (Ref. Wexler and Greenspan, equation (23), National Bureau of Standards).

$$P_{WB} = \exp\left[B \ln T_{WB} + \sum_{i=0}^{y} F_i T_{WB}^{i-2}\right] \qquad (3)$$

where:
P_{WB} is in Pascals (Pa)
T_{WB} = Web-bulb temperature (°K)
B = −12.150799
F_0 = $8.49922(10)^3$
F_1 = $-7.4231865(10)^3$
F_2 96.1635147
F_3 $2.4917646(10)^{-2}$
F_4 $-1.3160119(10)^{-5}$
F_5 $1.1460454(10)^{-8}$
F_6 $2.1701289(10)^{-11}$
F_7 $3.610258(10)^{-15}$
F_8 $3.8504519(10)^{-18}$
F_9 = $-1.4317(10)^{-21}$

(2) The table in Figure D79-5 may be used in lieu of equation (3).

(e) The saturated vapor pressure of water at the dry-bulb temperature (P_{DB}) is found (if required) by using dry-bulb absolute temperature (°K) in equation (3).

(f) The percent of relative humidity (RH) (if required) is defined by equation (4).

$$RH = \frac{P_v}{P_{DB}}\ (100) \qquad (4)$$

(g) The water-vapor volume concentration on a dry basis of the engine intake air (Y) is defined by equation (5).

$$Y = \frac{(H)(M_{air})}{(M_{H_2O})} = \frac{P_v}{BARO - P_v} \qquad (5)$$

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FIGURE D79-5—SATURATION VAPOR PRESSURE OVER WATER (PASCALS)

Temperature (°C)	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0	610.752	615.207	619.690	624.203	628.744	633.315	637.916	642.545	647.205	651.894
1	656.614	661.364	666.144	670.955	675.796	680.669	685.572	690.507	695.473	700.471
2	705.500	710.562	715.655	720.781	725.939	731.130	736.354	741.611	746.901	752.224
3	757.581	762.971	768.396	773.854	779.347	784.874	790.436	796.033	801.664	807.331
4	813.034	818.771	824.545	830.355	836.200	842.082	848.001	853.956	859.948	865.978
5	872.045	878.149	884.291	890.470	896.688	902.945	909.239	915.573	921.945	928.357
6	934.808	941.298	947.828	954.399	961.009	967.660	974.351	981.083	987.856	994.670
7	1001.53	1008.42	1015.36	1022.34	1029.37	1036.43	1043.54	1050.70	1057.89	1065.13
8	1072.41	1079.74	1087.11	1094.52	1101.98	1109.48	1117.03	1124.63	1132.27	1139.95
9	1147.68	1155.46	1163.28	1171.15	1179.07	1187.04	1195.05	1203.11	1211.21	1219.37
10	1227.57	1235.83	1244.13	1252.48	1260.88	1269.32	1277.82	1286.37	1294.97	1303.62
11	1312.32	1321.07	1329.87	1338.73	1347.63	1356.59	1365.60	1374.67	1383.78	1392.95
12	1402.17	1411.45	1420.78	1430.16	1439.60	1449.10	1458.64	1468.25	1477.91	1487.62
13	1497.39	1507.22	1517.11	1527.05	1537.04	1547.10	1557.21	1567.39	1577.62	1587.90
14	1598.25	1608.66	1619.12	1629.65	1640.24	1650.88	1661.59	1672.36	1683.18	1694.08
15	1705.03	1716.04	1727.12	1738.26	1749.46	1760.73	1772.06	1783.45	1794.91	1806.43
16	1818.01	1829.67	1841.38	1853.17	1865.02	1876.93	1888.91	1900.96	1913.08	1925.27
17	1937.52	1949.84	1962.23	1974.69	1987.21	1999.81	2012.48	2025.21	2038.02	2050.90
18	2063.85	2076.87	2089.97	2103.13	2116.37	2129.68	2143.07	2156.53	2170.06	2183.66
19	2197.34	2211.10	2224.93	2238.84	2252.82	2266.88	2281.02	2295.23	2309.52	2323.89
20	2338.34	2352.86	2367.47	2382.15	2396.91	2411.76	2426.68	2441.68	2456.77	2471.93
21	2487.18	2502.51	2517.93	2533.42	2549.00	2564.66	2580.41	2596.24	2612.16	2628.16
22	2644.25	2660.42	2676.68	2693.02	2709.46	2725.98	2742.59	2759.28	2776.07	2792.94
23	2809.91	2826.96	2844.11	2861.34	2878.67	2896.09	2913.60	2931.20	2948.89	2966.68
24	2984.56	3002.54	3020.61	3038.77	3057.03	3075.39	3093.84	3112.39	3131.03	3149.78
25	3168.62	3187.55	3206.59	3225.73	3244.96	3264.30	3283.73	3303.27	3322.91	3242.65
26	3362.49	3382.43	3402.48	3422.63	3442.89	3463.24	3483.71	3504.28	3524.95	3545.73
27	3566.62	3587.62	3608.72	3629.93	3651.25	3672.67	3694.21	3715.86	3737.61	3759.48
28	3781.46	3803.55	3825.75	3848.07	3870.50	3893.04	3915.70	3938.47	3961.36	3984.36
29	4007.48	4030.71	4054.06	4077.53	4101.12	4124.83	4148.65	4172.59	4196.66	4220.84
30	4245.15	4269.58	4294.13	4318.80	4343.60	4368.52	4393.56	4418.73	4444.02	4469.44

§ 86.345-79 Emission calculations.

(a) The following abbreviations (and units) are used in this section.

α = atomic hydrogen/carbon ratio of the fuel

ϕ = dry fuel-air ratio (measured)/fuel-air ratio (stoichiometric)

BARO = Barometric pressure (in. *HgA*)

BHP = Brake horsepower

BSCO = Brake specific carbon monoxide emissions, (gm/*BHP-HR*)

BSFC = Brake specific fuel consumption (lb/*BHP-HR*)

BSHC = Brake specific hydrocarbon emissions (gm/*BHP-HR*)

$BSNO_x$ = Brake specific oxides of nitrogen emissions (gm/*BHP-HR*)

DCO = CO volume concentration in exhaust, ppm (dry)

DCO_2 = CO_2 volume concentration in exhaust, percent (dry)

DHC = HC volume carbon concentration in exhaust, ppmC (dry)

DKNO = NO volume concentration in exhaust, in ppm (dry and humidity corrected)

EIP = engine intake pressure (in. *HgA*) = *BARO* inlet depression

f/a = measured dry fuel-air ratio

G = humidity of the inlet air in grains of water per pound of dry air = (453.59/0.0648) *H*, (see § 86.344)

K = water gas equilibrium constant = 3.5

K_{NOx} = Humidity correction factor for oxides of nitrogen

K_w = Wet to dry correction factor

M_c = Atomic weight of carbon

$(M_c + M_H)$ = mean molecular weight of the fuel per carbon atom

M_{CO} = Molecular weight of CO

M_f = Mass flow-rate of fuel used in the engine in lb/hr = W_f/453.59

M_H = Atomic weight of hydrogen

M_{NO2} = Molecular weight of nitrogen dioxide (NO_2)

T = Temperature of inlet air (°F)

W_{CO} = Mass rate of CO in exhaust, grams/hr

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W = Mass flow-rate of fuel used in the engine, in grams/hr (453.59) x (W, lbs/hr)

WHC = HC volume concentration in exhaust, ppm C (wet)

W_{HC} = Mass rate of HC in exhaust, grams/hr

W_{NO_x} = Mass rate of NO_x in exhaust, grams/hr

Y = H_2O volume concentration of intake air (See § 86.344)

(b) Determine the exhaust species volume concentration for each mode.

(c) (1) Convert wet basis measurements to a dry basis by the following:

Dry concentrations = $1/K_w$ x wet concentrations. K_w is defined by the equation in Figure D79-6.

(2) For Diesel engines, for each mode use the measured engine (f/a) entering the combustion chamber when calculating ϕ. If applicable bleed air, etc. must be subtracted from the measured air flow (see § 86.313).

(3) For gasoline-fueled engines, optional for Diesel engines, calculate ϕ for each mode by substituting WHC for DHC in the (f/a) equations in paragraph (d) of this section.

(4) Calculate a Y value for each gasoline-fueled engine test from the pretest data. Apply the Y value to the K_w equation for the entire test.

(5) Calculate a separate Y value for each Diesel test segment from the pretest-segment data. Apply the Y value to the K_w equation for the entire test-segment.

$$K_w = \frac{1}{1 + \left[\frac{\alpha \left(\frac{DCO_2}{10^2} + \frac{DCO}{10^6} \right) - \frac{2Y}{a} \left(\frac{DCO_2}{10^2} + \frac{DCO}{10^6} + \frac{WHC}{10^6} \right) \left(1 + \frac{\alpha}{4} \right)}{2 \left(1 + \frac{\frac{DCO}{10^6}}{\left(\frac{DCO_2}{10^2} \right)_K} \right)} \right]}$$

Figure D79-6 K_w - WET TO DRY CORRECTION FACTOR

(d) Compute the dry (f/a) if required as follows:

$$(f/a) = \frac{4.77\ (1 + \alpha/4)\ (f/a)\ \text{stoich}}{\frac{1}{\Sigma} - \left(\frac{DCO}{2\Sigma\,(10)^6} \right) - \left(\frac{DHC}{\Sigma\,10^6} \right) + \frac{\alpha}{4} \left(1 - \frac{DHC}{\Sigma\,(10^6)} \right) - \frac{.75\alpha}{\left(\frac{K}{\frac{DCO}{\Sigma\,(10)^6}} \right) + \left(\frac{(1-K)}{1 - \frac{DHC}{\Sigma\,(10)^6}} \right)}}$$

$$(f/a)\ \text{stoich} = \frac{M_C + \alpha M_H}{138.18\ (1 + \alpha/4)}$$

where

$$\Sigma = DCO_2/10^2 + DCO/10^6 + DHC/10^6$$

(e) *Data validation*—(1) *Diesel engines only.* Compare the calculated dry (f/a) with the measured fuel and air flow. For a valid test the emission calculated (f/a) must agree within 10 percent of the measured (f/a) for each mode. Diesel engine idle and 2 percent modes do not have to meet this requirement.

(2) *Fuel/Air ratio comparison.* When comparing measured (f/a) ratio to an emissions calculated (f/a) ratio, the measured air flow (in terms of mass) is the total mass of air entering the exhaust pipe. This may include additions of air mass to the exhaust pipe by an air injection system.

(3) Other methods of data validation may be used if prior approval is obtained from the Administrator.

(4) Data validation techniques that have obtained prior approval from the Administrator for use on gasoline-fueled engines may be used to determine void tests.

(f) Multiply the dry nitric oxide volume concentrations by the follow-

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ing humidity correction factor to obtain *DKNO*:

(1) Gasoline-fueled engines:

$$K_{NO_x} = 0.6272 + 0.00629G - 0.0000176G^2$$

(2) Diesel engines:

$$K_{NO_x} = \frac{1}{1 + A(G-75) + B(T-85)}$$

where:

$A = 0.044\,(f/a) - 0.0038$

$B = -0.116(f/a) + 0.0053$

T = Temperature of inlet air, °F.

(g) Calculate the mass emissions of each species in grams per hour for each mode as follows:

(1) $$\text{HC grams/hr} = W_{HC} = \frac{(DHC/10^4)\,W_f}{(DCO/10^4) + DCO_2 + (DHC/10^4)}$$

(2) $$\text{CO grams/hr} = W_{CO} = \frac{M_{CO}\,(DCO/10^4)\,W_f}{(M_C + \alpha M_H)[(DCO/10^4) + DCO_2 + (DHC/10^4)]}$$

(3) $$\text{NO}_x \text{ grams/hr} = W_{NO_x} = \frac{M_{NO_2}\,(DKNO/10^4)\,W_f}{(M_C + \alpha M_H)[(DCO/10^4) + DCO_2 + (DHC/10^4)]}$$

(h)(1) For gasoline-fueled engines, weight the mass values of *BHP*, W_{HC}, W_{CO}, *Mf*, and W_{NO_x} for each mode by multiplying the modal mass values by the appropriate modal weighting factor prescribed by § 86.335.

(2) For Diesel engines, weight the values of *BHP*, W_{HC}, W_{CO}, W_{NO_x}, and *Mf* as follows:

(i) Weight the values from each idle mode by multiplying the values by (0.067);

(ii) Weight the remaining modes by multiplying the values by 0.08.

(i) Calculate the brake specific emissions for:

(1) Each gasoline-fueled engine test cycle, and

(2) Each Diesel engine test by summing the weighted values (*BHP*, W_{HC}, W_{CO}, and W_{NO_x}) from each mode as follows:

$$BSHC(t) = \frac{\Sigma \text{ weighted } W_{HC}}{\Sigma \text{ weighted } BHP}$$

$$BSCO(t) = \frac{\Sigma \text{ weighted } W_{CO}}{\Sigma \text{ weighted } BHP}$$

$$BSNOx(t) = \frac{\Sigma \text{ weighted } W_{NO_x}}{\Sigma \text{ weighted } BHP}$$

(t) = Test cycle number (t = 1, 2) (gasoline-fueled engines only).

(j) (1) Calculate the brake-specific fuel consumption (*BSFC*) from the nonweighted *BHP* and *Mf* for each mode. Gasoline-fueled engine idle and *CT* modes, and Diesel idle modes are excluded.

(2) For gasoline-fuel engines use:

$$BSFC = \frac{M_f}{BHP}$$

(3) For Diesel engines use:

$$CBSFC = \frac{M_f}{CBHP}$$

where:

$$CBHP = BHP\left[\frac{29.00}{EIP}\right]\left[\frac{T + 459.69}{85 + 459.69}\right]^{0.7}$$

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(4) Other methods of correcting power to determine *BSFC* may be used only with prior approval of the Administrator.

(k) Calculate the weighted brake-specific fuel consumption (*WBSFC*) for

(1) each gasoline engine test cycle by:

$$WBSFC(t) \quad \frac{\Sigma \text{weighted} M_i}{\Sigma \text{weighted} BHP}$$

where:

t Test cycle number (t 1,2)

(2) each Diesel engine test by:

$$WCBSFC \quad \frac{\Sigma \text{weighted} M_i}{\Sigma \text{weighted} CBHP}$$

(l) For gasoline-fueled engines, calculate the brake-specific emissions and fuel consumption for the complete test as follows:

$BSHC(T)$ 0.35 $BSHC(1)$ + 0.65 $BSHC(2)$
$BSCO(T)$ 0.35 $BSCO(1)$ + 0.65 $BSCO(2)$
$BSNO_x(T)$ 0.35 $BSNO_x(1)$ + 0.65 $BSNO_x(2)$
$WBSFC(T)$ 0.35 $WBSFC(1)$ + 0.65 $WBSFC$ (2)

§ 86.346-79 Alternative NO_x measurement technique.

(a) Oxides of nitrogen (NO_x) may be measured with the following "alternative instrumentation" for both Diesel and gasoline-fueled engines. The "alternative instrumentation" shall consist of:

(1) A heated sample line maintained above the dew point:

(2) An NO_2 to NO converter obtaining a sample directly from the heated sample line; and

(3) A combination per 40 CFR 86.777 or 40 CFR 86.977, whichever is applicable of a water trap, dryer, flow controls, and an NO NDIR analyzer obtaining a sample from the converter.

(b) The provisions of 40 CFR 86 Subpart D shall apply to the "alternative instrumentation", where applicable, with the following exceptions:

(1) Analyzer specifications found in §§ 86.315, 86.321, and 86.322 do not apply to the "alternative instrumentation".

(2) For the purposes of this section, the full-scale value specified in § 86.338 (a)(1) shall be 1,500 ppm for Diesel engines and 2,500 ppm for gasoline-fueled engines.

(c) The "alternative instrumentation" shall be calibrated per § 86.330.

(d) The NO NDIR analyzer shall meet the performance and interference specifications contained in 40 CFR 86.777 or 40 CFR 86.977, whichever is applicable.

(e) The operation of the dryer shall follow good engineering practice such that the test results are not altered. Proper preconditioning of the dryer is allowed.

§ 86.347-79 Alternative calculations for Diesel engines.

(a) This section applies to Diesel engines only. Gasoline-fueled engines must use the calculations in § 86.345.

(b) For Diesel engines, the calculations specified in 40 CFR 86.977-15 may be substituted for § 86.345.

(c) The modal *BSFC* and weighted *BSFC* shall be calculated per § 86.345.

(d) If the provisions of this section are used, a CO_2 measurement is not required.

(e) Both 40 CFR 86.977-15(a) and § 86.313 shall apply to air-flow measurements. For the purposes of this section, the air-flow measurement accuracy specified in § 86.313 shall be ±1 percent.

§ 86.348-79 Alternative to fuel H/C analysis.

(a) Fuel H/C analysis need not be performed if the following average H/C ratios are used for all calculations.

(1) #1 Diesel: 1:93

(2) #2 Diesel: 1:80

(3) Gasoline: 1.85

[46 FR 50496, Oct. 13, 1981]

Subpart E—Emission Regulations for 1978 and Later New Motorcycles, General Provisions

SOURCE: 42 FR 1126, Jan. 5, 1977, unless otherwise noted.

§ 86.401-78 General applicability.

(a) This subpart applies to 1978 and later model year, new gasoline-fueled motorcycles built after 31 December 1977.

(b) Motorcycles with engine displacements less than 50 cc (3.1 cu. in.) are excluded from the requirements of this subpart.

(c) A motorcycle is excluded from the requirements of this subpart, if, with an 80 kg (176 lb) driver, it cannot:

(1) Start from a dead stop using only the engine, or

(2) Exceed a maximum speed of 40 km/h (24.9 mph) level paved surfaces.

§ 86.402-78 Definitions.

(a) The definitions in this section apply to this subpart and also to Subpart F.

"Act" means Part A of title II of the Clean Air Act, 42 U.S.C. 1857 f-1 through f-7, as amended by Pub. L. 91-604.

"Administrator" means the Administrator of the Environmental Protection Agency or his authorized representative.

"Class", see § 86.419.

"Crankcase emissions" means airborne substances emitted to the atmosphere from any portion of the engine crankcase ventilation or lubrication systems.

"Curb mass" means the actual or manufacturer's estimated mass of the vehicle with fluids at nominal capacity and with all equipment specified by the Administrator.

"Displacement", and "Displacement Class", see § 86.419.

"Engine family" means the basic classification unit of a manufacturer's product line used for the purpose of test fleet selection and determined in accordance with § 86.420.

"Engine-displacement-system combination" means an engine family-displacement-emission control system combination.

"EPA Enforcement Officer" means any officer or employee of the Environmental Protection Agency so designated in writing by the Administrator (or by his designee).

"Exhaust emissions" means substances emitted to the atmosphere from any opening downstream from the exhaust port of a motor vehicle engine.

"Fuel system" means the combination of fuel tank, fuel pump, fuel lines, oil injection metering system, and carburetor or fuel injection components, and includes all fuel system vents.

"Loaded vehicle mass" means curb mass plus 80 kg (176 lb.), average driver mass.

"Model year" means the manufacturer's annual production period (as determined by the Administrator) which includes January first of such calendar year. If the manufacturer has no annual production period, the term "model year" shall mean the calendar year.

"Motorcycle" means any motor vehicle with a headlight, taillight, and stoplight and having: Two wheels, or Three wheels and a curb mass less than or equal to 680 kilograms (1499 pounds).

"Oxides of nitrogen" means the sum of the nitric oxide and nitrogen dioxide contained in a gas sample as if the nitric oxide were in the form of nitrogen dioxide.

"Scheduled maintenance" means any adjustment, repair, removal, disassembly, cleaning, or replacement of vehicle components or systems which is performed on a periodic basis to prevent part failure or vehicle malfunction, or anticipated as necessary to correct an overt indication of vehicle malfunction or failure for which periodic maintenance is not appropriate.

"Span gas" means a gas of known concentration which is used routinely to set the output level of any analyzer.

"System" includes any motor vehicle modification which controls or causes the reduction of substances emitted from motor vehicles.

"Total test distance" is defined for each class of motorcycles in § 86.427-78.

"Useful life" is defined for each class (see § 86.419) of motorcycle:

Class I—5.0 years or 12,000 km (7,456 miles), whichever first occurs.

Class II—5.0 years or 18,000 km (11,185 miles), whichever first occurs.

Class III—5.0 years or 30,000 km (18,641 miles), whichever first occurs.

"Unscheduled maintenance" means any inspection, adjustment, repair, removal, disassembly, cleaning, or replacement of vehicle components or systems which is performed to correct or diagnose a part failure or vehicle malfunction which was not anticipated.

"Zero (0) kilometers (miles)" means that point after initial engine starting at which normal assembly line operations and adjustments are completed.

[42 FR 1126, Jan. 5, 1977, as amended at 42 FR 56737, Oct. 28, 1977]

§ 86.403-78 Abbreviations.

The abbreviations used in this subpart have the following meanings in both capital and lowercase:

ASTM—American Society for Testing and Materials.
C—Celsius.
cc—Cubic centimetre(s).
cfh—Cubic feet per hour.
cfm—Cubic feet per minute.
cm—Centimetre(s).
CO—Carbon monoxide.
CO_2—Carbon dioxide.
Conc—Concentration.
cu.—Cubic.
CVS—Constant volume sampler.
EGR—Exhaust gas recirculation.
EP—End point.
EPA—Environmental Protection Agency.
F—Fahrenheit.
h—hour.
HC—Hydrocarbon(s).
Hg—Mercury.
H_2O—Water.
in.—Inch(es).
K—Kelvin.
kg—Kilogram(s).
km—Kilometre(s).
kpa—Kilopascals.
lb—Pound(s).
m—Metre(s).
mph—Miles per hour.
mm—Millimetre(s).
N_2—Nitrogen.
NO_x—Oxides of nitrogen.
No.—Number.
O_2—Oxygen.
Pa—Pascal(s).
Pb—lead.
ppm—Parts per million by volume.
psi—Pounds per square inch.
psig—Pounds per square inch gauge.
R—Rankine.
rpm—Revolutions per minute.
wt—Weight.
°—Degree(s).
%—Percent.

§ 86.404-78 Section numbering.

(a) The year of initial applicability of a section is indicated by its section number. The two digits following the hyphen designate the first model year for which a section is effective. A section remains effective until superseded.

Example. Section 86.411-78 applies to 1978 and subsequent model years until it is superseded. If a § 86.411-81 is promulgated it would take effect beginning with 1981; § 86.411-78 would apply to years 1978 through 1980.

(b) A reference to a section without a year designation implies the appropriate model year.

Example. When considering 1979 vehicles a reference to § 86.411 implies § 86.411-79. However if no § 86.411-79 has been promulgated then § 86.411-78 is implied; See paragraph (a) of this section.

§ 86.405-78 Measurement system.

(a) This subpart and Subpart F have been written using System International (SI) units. SI units will be used to determine compliance with these regulations. English equivalents have been indicated solely for the user's convenience.

§ 86.406-78 Introduction, structure of subpart, further information.

(a) This subpart contains general provisions regulating the emission of air pollution from new motorcycles. Test procedures are found in Subpart F.

(b) Several discrete concepts are addressed:

(1) *Requirements.* §§ 86.407 to 86.415.

(2) *Application for certification.* §§ 86.416 and 86.417.

(3) *Test fleet selection.* §§ 86.418 to 86.423.

(4) *Service accumulation, testing, maintenance, certification.* §§ 86.424 to 86.439.

(5) *Administrative provisions.* §§ 86.440 to 86.444.

(c) The certification procedure to be followed depends upon the manufacturer's projected sales.

(1) New motorcycles, produced by a manufacturer whose projected U.S. sales of motorcycles is 10,000 or more units (for the model year in which certification is sought) shall demonstrate compliance with all general standards and all specific emission requirements before they can be sold in the United States. The manufacturer is required to submit an application with sales data, product information, required maintenance, testing and service accumulation procedures. The Administrator will select vehicle(s) which will represent the manufacturer's product line. The manufacturer is required to construct these vehicles to be representative of actual production. Service is accumulated and emission tests performed with data submitted to the Administrator. The Administrator may run his own tests to confirm the manufacturer's results. The Administrator will review the data and either grant or deny certification. If the manufacturer wishes to make changes to a certified vehicle, or to produce a new vehicle, the Administrator must be notified. The Administrator may require testing to demonstrate continued compliance with emission standards. Each vehicle must be labeled with tune up specifications and the purchaser must be supplied with maintenance instructions. Also, information on production vehicles must be supplied to the Administrator.

(2) New motorcycles produced by a manufacturer whose projected U.S. sales of motorcycles is less than 10,000 units (for the model year in which certification is sought) shall meet both the general standards and specific emission requirements described in §§ 86.401 through 86.417, § 86.425, § 86.437, and §§ 86.440 through 86.444 of this subpart before they can be sold in the United States. The manufacturer is required to submit an application containing a statement that his vehicles conform to the applicable emission standards. The manufacturer is required to retain in his records, but not submit with the application, valid emission test data which support his statement. The Administrator will review the application and either grant or deny certification. Each vehicle must be labeled with tune up specifications and the purchaser must be supplied with maintenance instructions. Also, information on production vehicles must be supplied to the Administrator.

(d) Manufacturers who are considering an application should contact: Director, Certification Division, Environmental Protection Agency, 2565 Plymouth Rd., Ann Arbor, Michigan 48105 and state whether he plans to certify for total sales of greater than or less than 10,000 vehicles for the applicable model year.

§ 86.407-78 Certificate of conformity required.

Every new motorcycle manufactured for sale, sold, offered for sale, introduced or delivered for introduction into commerce, or imported into the United States which is subject to any of the standards prescribed in this subpart is required to be covered by a certificate of conformity issued pursuant to this subpart.

§ 86.408-78 General standards; increase in emissions; unsafe conditions.

(a) Any system installed on or incorporated in a new motorcycle to enable such vehicle to conform to standards imposed by this subpart:

(1) Shall not in its operation or function cause the emission into the ambient air of any noxious or toxic substance that would not be emitted in the operation of such vehicle without such system, except as specifically permitted by regulation; and

(2) Shall not in its operation, function, or malfunction result in any unsafe condition endangering the motorcycle, its rider(s), or persons or property in close proximity to the vehicle.

(b) Every manufacturer of new motorcycles subject to any of the standards imposed by this subpart shall, prior to taking any of the actions specified in section 203(a)(1) of the Act, test or cause to be tested motorcycles in accordance with good engineering practice to ascertain that such test vehicles will meet the requirements of

this section for the useful life of the vehicle.

§ 86.409-78 Defeat devices, prohibition.

(a) No motorcycle shall be equipped with a defeat device.

(b) Defeat device means any element of design which:

(1) Senses temperature, vehicle speed, engine RPM, transmission gear, manifold vacuum, or any other parameter for the purpose of activating, modulating, delaying or deactivating the operation of any part of the emission control system and

(2) Reduces the effectiveness of the emission control system under conditions which may reasonably be expected to be encountered in normal urban vehicle operation and use, unless

(i) Such conditions are substantially included in the Federal emission test procedure, or

(ii) The need for the device is justified in terms of protecting the vehicle against damage or accident, or

(iii) The device does not go beyond the requirements of engine starting or warm-up.

§ 86.410-80 Emission standards for 1980 motorcycles.

(a)(1) Exhaust emissions from 1980 model year motorcycles shall not exceed:

(i) *Hydrocarbons.* 5.0 grams per vehicle kilometre.

(ii) *Carbon monoxide.* 12 grams per vehicle kilometre.

(2) The standards set forth in paragraph (a)(1) of this section refer to the exhaust emitted over driving schedules as set forth in Subpart F and measured and calculated in accordance with those procedures.

(b) No crankcase emissions shall be discharged into the ambient atmosphere from any new motorcycle subject to this subpart.

§ 86.411-78 Maintenance instructions, vehicle purchaser.

(a) The manufacturer shall furnish or cause to be furnished to the ultimate purchaser of each new motorcycle the written instructions for the periodic and anticipated maintenance and use of the vehicle by the ultimate purchaser as may be reasonable and necessary to assure the proper functioning of emission control systems for the vehicle's useful life.

(1) Such instructions shall be provided for those vehicle and engine components listed in Appendix VI to this part (and for any other components) to the extent that maintenance of these components is necessary to assure the proper functioning of emission control systems.

(2) Such instructions shall be in the English language and in clear, and to the extent practicable, nontechnical language.

(b) The maintenance instructions required by this section shall:

(1) Contain a general description of the documentation which the manufacturer will require from the ultimate purchaser or any subsequent purchaser as evidence of compliance with the instructions, and

(2) Specify the performance of all scheduled maintenance performed by the manufacturer under § 86.428.

§ 86.412-78 Maintenance instructions, submission to Administrator.

(a) *Instructions for ultimate purchaser.* (1) The manufacturer shall provide to the Administrator, at least 30 days before being supplied to the ultimate purchaser (unless the Administrator consents to a lesser period of time), a copy of the maintenance instructions which the manufacturer proposes to supply to the ultimate purchaser. The instructions must include the periodic and anticipated maintenance contained in the application for certification or contained in the manufacturers' records (if anticipated sales are less than 10,000 units). Such instructions must be reasonable and necessary to assure the proper functioning of the vehicle's emission control systems.

(2) Any revision to the maintenance instructions which will affect emissions shall be supplied to the Administrator at least 30 days before being supplied to the ultimate purchaser unless the Administrator consents to a lesser period of time.

(b) *Other instructions.* The manufacturer of any new motorcycle subject to any of the standards prescribed in this

subpart shall submit to the Administrator at the time of issuance by the manufacturer, copies of all sales brochures, instructions, or explanations regarding the use, repair, adjustment, maintenance, or testing of such vehicle relevant to the control of crankcase or exhaust emissions, issued by the manufacturer for use by other manufacturers, assembly plants, distributors, dealers, repair facilities, and ultimate purchasers. Any material not translated into the English language need not be submitted unless specifically requested by the Administrator.

§ 86.413-78 Labeling.

(a)(1) The manufacturer of any motorcycle shall, at the time of manufacture, affix a permanent, legible label, of the type and in the manner described below, containing the information hereinafter provided, to all production models of such vehicles available for sale to the public and covered by a certificate of conformity.

(2) A permanent, legible label shall be affixed in a readily accessible position. Multi-part labels may be used.

(3) The label shall be affixed by the vehicle manufacturer who has been issued the certificate of conformity for such vehicle, in such a manner that it cannot be removed without destroying or defacing the label.

(4) The label shall contain the following information lettered in the English language in block letters and numerals, which shall be of a color that contrasts with the background of the label:

(i) *The label heading.* Vehicle Emission Control Information;

(ii) Full corporate name and trademark of the manufacturer;

(iii) Engine displacement (in cubic centimetres) and engine family identification;

(iv) Engine tune up specifications and adjustments, as recommended by the manufacturer, including idle speed, ignition timing, and the idle air-fuel mixture setting procedure and value (e.g., idle CO, idle air-fuel ratio, idle speed drop). These specifications shall indicate the proper transmission position during tune up;

(v) Any specific fuel or engine lubricant requirements (e.g., lead content, Research octane number, engine lubricant type);

(vi) An unconditional statement of conformity to USEPA regulations which includes the model year; for example, This Vehicle Conforms to USEPA Regulation Applicable to ..... Model Year New Motorcycles.

(b) The provisions of this section shall not prevent a manufacturer from also reciting on the label that such vehicle conforms to any other applicable Federal or State standards for new motorcycles or any other information that such manufacturer deems necessary for, or useful to, the proper operation and satisfactory maintenance of the vehicle.

[42 FR 1126, Jan. 5, 1977, as amended at 42 FR 56737, Oct. 28, 1977]

§ 86.414-78 Submission of vehicle identification numbers.

(a) Upon request by the Administrator, the manufacturer of any motorcycle covered by a certificate of conformity shall, within 30 days, identify by vehicle identification number, the vehicle(s) covered by the certificate of conformity.

(b) The manufacturer of any motorcycle covered by a certificate of conformity shall furnish to the Administrator, at the beginning of each model year, any vehicle identification number coding system which identifies whether such vehicle(s) are covered by a certificate of conformity.

§ 86.415-78 Production vehicles.

(a) Any manufacturer obtaining certification shall supply to the Administrator, upon his request, a reasonable number of production vehicles selected by the Administrator which are representative of the engines, emission control systems, fuel systems, and transmissions offered and typical of production models available for sale under the certificate. These vehicles shall be supplied for testing at such time and place and for such reasonable periods as the Administrator may require.

(b) Any manufacturer obtaining certification shall notify the Administrator, on a quarterly basis, of the number of vehicles of each engine

family-engine displacement-emission control system-fuel system-transmission type-inertial mass category combination produced for sale in the United States during the preceding quarter.

(c) All motorcycles covered by a certificate of conformity shall prior to delivery to the ultimate purchaser be adjusted, by the manufacturer or his agent, to the ignition timing specification detailed in § 86.413.

§ 86.416-80 Application for certification.

(a) New motorcycles produced by a manufacturer whose projected sales in the United States is 10,000 or more units (for the model year in which certification if sought) are covered by the following:

(1) An application for a certificate of conformity to the regulations in the English language applicable to new motorcycles shall be made to the Administrator by the manufacturer and shall be updated and corrected by amendment. Where possible, a manufacturer should include in a single application for certification, a description of all vehicles in each class for which certification is required. A manufacturer may, however, choose to apply separately for certification of part of his product line. The selection of test vehicles and the computation of test results will be determined separately for each application.

(2) The application shall be in writing signed by an authorized representative of the manufacturer, and shall include the following:

(i) Identification and description of the vehicles covered by the application and a description of their engine, emission control system and fuel system components. This shall include a detailed description of each auxiliary emission control device. Transmission gear ratios, overall drive ratios and vehicle mass (or range of mass) shall also be included. The label and its location shall be specified, § 86.413. Available optional equipment shall be described.

(ii) The range of available fuel and ignition system adjustments.

(iii) Projected U.S. sales data sufficient to enable the Administrator to select a test fleet representative of the vehicles for which certification is requested. If reduced testing based on low sales volume is requested the method of predicting sales shall be described.

(iv) A description of the test equipment (if applicable) and fuel and engine lubricant proposed to be used.

(v) A description of the proposed service accumulation procedure and a description of the proposed scheduled maintenance.

(vi) A statement of recommended periodic and anticipated maintenance and procedures necessary to assure that the vehicles covered by a certificate of conformity in operation conform to the regulations, listings of the fuels and lubricants to be recommended to the ultimate purchaser and a description of the program for training of personnel for such maintenance, and the equipment required to perform this maintenance.

(vii) A description of normal assembly line operations and adjustments if such procedures exceed 10 km (6.2 miles) or one hour of engine operation.

(3) Completed copies of the application and of any amendments thereto, and all notifications under §§ 86.438 and 86.439 shall be submitted in such multiple copies as the Administrator may require.

(4) For purposes of this section, "auxiliary emission control device" means any element of design which senses temperature, vehicle speed, engine RPM, transmission gear, manifold vacuum, or any other parameter for the purpose of activating, modulating, delaying, or deactivating the operation of any part of the emission control system.

(b) New motorcycles produced by a manufacturer whose projected sales in the United States is less than 10,000 units (for the model year in which certification is sought) are covered by the following:

(1) All the information that would otherwise be required to be submitted to EPA under paragraph (a)(2) of this section must be made a part of the manufacturer's records, except there is no requirement to submit the information to the Administrator or receive approval from the Administrator.

(2) Section 86.437 details the statements that these manufacturers are required to provide to the Administrator.

(c) For the purpose of determining applicability of paragraphs (a) or (b) of this section, where there is more than one importer or distributor of vehicles manufactured by the same person, the projected sales shall be the aggregate of the projected sales of those vehicles by such importers or distributors.

(d)(1) The Administrator has determined that the following certification procedure may be used to demonstrate compliance for each motorcycle engine family for which certification is sought. Manufacturers may follow these procedures at their option.

(i) The manufacturer shall satisfy all applicable requirements of Part 86 necessary to demonstrate compliance with the standards for each class of new motorcycles for which certification is sought.

(ii) As specifically allowed by the Administrator the manufacturer shall assume the responsibility for part or all of the decisions applicable to the family for which certification is sought and which are within the jurisdiction of the Administrator, with the exception that the Administrator will determine whether a test motorcycle has met the applicable emission standards.

(iii) The manufacturer shall maintain, update, and correct all records and information required.

(iv) The Administrator may review a manufacturer's records at any time. At the Administrator's discretion, this review may take place either at the manufacturer's facility or at another facility designated by the Administrator.

(v) At the Administrator's request, the manufacturer shall notify the Administrator of the status of the certification program including projected schedules of those significant accomplishments specified by the Administrator.

(vi) The manufacturer shall permit the Administrator to inspect any facilities, records, and vehicles from which data were obtained under the abbreviated certification review procedure.

(vii) Upon completing all applicable requirements of Part 86 the manufacturer shall submit a separate application for a certificate of conformity for each class of new motorcycles for which certification is sought. Such application shall be made in writing to the Administrator by the manufacturer.

(A) The Administrator may approve or disapprove in whole or in part an application for certification according to the procedures specified in § 86.417-78(b).

(B) If, after a review of the application for certification, test reports and data submitted by the manufacturer, data obtained during an inspection, and any other pertinent data or information, the Administrator determines that a test vehicle(s) has not met the requirements of the Act and the applicable subpart, he will notify the manufacturer in writing and set forth the reason(s) for the determination.

(2) Those families which are not following the procedure described in paragraph (d)(1) of this section will follow the procedure in this subpart with the exception of paragraph (d)(1) of this section.

(e) The Administrator may require that an engine family previously allowed to be subjected to the abbreviated certification review procedure be transferred to the complete review procedure.

[42 FR 56737, Oct. 28, 1977, as amended at 45 FR 26045, Apr. 17, 1980]

§ 86.417-78 Approval of application for certification.

(a) After a review of the application for certification and any other information which the Administrator may require, the Administrator may approve the application and select a test fleet as appropriate.

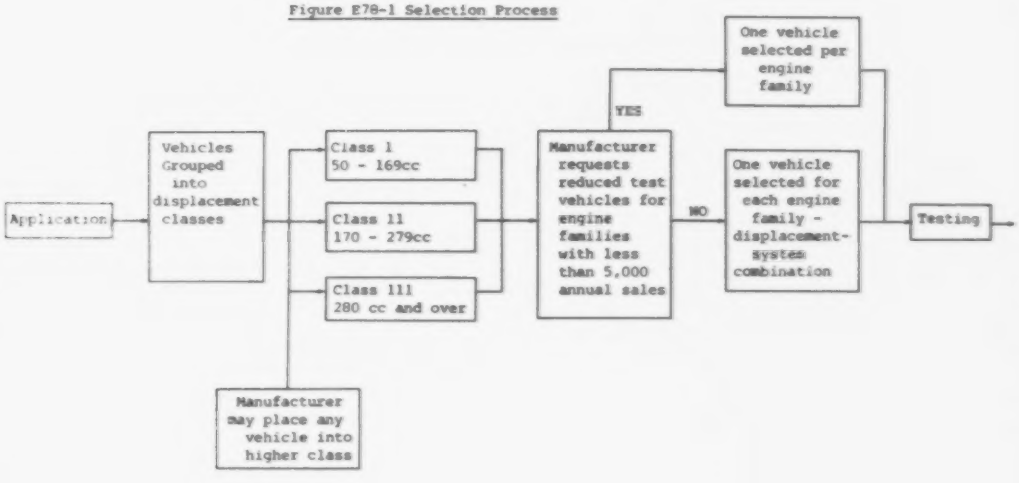
(b) The Administrator may disapprove in whole or in part an application for certification for reasons including incompleteness, inaccuracy, inappropriate proposed distance accumulation procedures, maintenance, test equipment, label content or location, fuel or lubricant, and incorporation of defeat devices in vehicles described by the application. Where any

part of an application is rejected the Administrator shall notify the manufacturer in writing and set forth the reasons for such rejection. The manufacturer may request a hearing under § 86.443.

§ 86.418-78 Test fleet selection.

(a) Test fleet selection and requirements on test vehicles are found in §§ 86.419 to 86.423. This selection process is also graphically depicted in Figure E78-1.

Figure E78-1 Selection Process


Application
Vehicles Grouped into displacement classes
Class I 50 - 169cc
Class II 170 - 279cc
Class III 280 cc and over
Manufacturer may place any vehicle into higher class
Manufacturer requests reduced test vehicles for engine families with less than 5,000 annual sales
YES
NO
One vehicle selected per engine family
One vehicle selected for each engine family - displacement-system combination
Testing

§ 86.419-78 Engine displacement, motorcycle classes.

(a)(1) Engine displacement shall be calculated using nominal engine values and rounded to the nearest whole cubic centimetre, in accordance with ASTM E 29-67.

(2) For rotary engines, displacement means the maximum volume of a combustion chamber between two rotor tip seals minus the minimum volume of that combustion chamber between those two rotor tip seals times three times the number of rotors.

cc = (max. chamber volume-min. chamber volume) × 3 × no. of rotors

(b) Motorcycles will be divided into classes based on engine displacement.

(1) Class I—50 to 169 cc (3.1 to 10.4 cu. in.).

(2) Class II—170 to 279 cc (10.4 to 17.1 cu. in.).

(3) Class III—280 cc and over (17.1 cu. in. and over).

(c) At the manufacturer's option, a vehicle described in an application for certification may be placed in a higher class (larger displacement). All procedures for the higher class must then be complied with, compliance with emission standards will be determined on the basis of engine displacement.

§ 86.420-78 Engine families.

(a) The vehicles covered in the application will be divided into groupings whose engines are expected to have similar emission characteristics throughout their useful life. Each group of engines with similar emission characteristics shall be defined as a separate engine family.

(b) *Reciprocating families.* To be classed in the same engine family, reciprocating engines must be identical

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in all of the following applicable respects:

(1) The combustion cycle.

(2) The cooling mechanism.

(3) The cylinder configuration (inline, vee, opposed, bore spacings, etc.).

(4) The number of cylinders.

(5) The engine displacement class, § 86.419.

(6) The method of air aspiration.

(7) The number of catalytic converters, location, volume, and composition.

(8) The thermal reactor characteristics.

(9) The number of carburetors.

(10) The prechamber characteristics.

(c) At the manufacturer's option, reciprocating engines identical in all the respects listed in paragraph (b) of this section may be further divided into different engine families if the Administrator determines that they may be expected to have different emission characteristics. This determination will be based upon a consideration of features such as:

(1) The bore and stroke.

(2) The combustion chamber configuration.

(3) The intake and exhaust timing method of actuation (poppet valve, reed valve, rotary valve, etc.).

(4) The intake and exhaust valve or port sizes, as applicable.

(5) The fuel system.

(6) The exhaust system.

(d) *Rotary families.* To be classed in the same engine family, rotary combustion cycle engines must be identical in all of the following applicable respects:

(1) The major axis of the epitrochoidal curve.

(2) The minor axis of the epitrochoidal curve.

(3) The generating radius of the epitrochoidal curve.

(4) The cooling mechanism.

(5) The number of rotors.

(6) The engine displacement class, § 86.419.

(7) The method of air aspiration.

(8) The number of catalytic converters, location, volume and composition.

(9) The thermal reactor characteristics.

(10) The number of carburetors.

(11) The prechamber characteristics.

(e) At the manufacturer's option, rotary combustion cycle engines identical in all the respects listed in paragraph (d) of this section, may be further divided into different engine families if the Administrator determines that they may be expected to have different emission characteristics. This determination will be based upon a consideration of features, such as:

(1) The width of the rotor housing.

(2) The type and location of intake port (side, peripheral, combination, etc.).

(3) The number of spark plugs per rotor.

(4) The fuel system.

(5) The exhaust system.

(f) Where engines are of a type which cannot be divided into engine families based upon the criteria listed in paragraphs (b) and (d) of this section, the Administrator will establish families of those engines based upon the features most related to their emission characteristics.

[42 FR 1126, Jan. 5, 1977, as amended at 44 FR 48205, Aug. 17, 1979]

§ 86.421-78 Test fleet.

(a) A test vehicle will be selected by the Administrator to represent each engine-displacement-system combination. The configuration (engine calibration, transmission, drive ratio, mass, options, etc.) in the manufacturer's application which the Administrator believes has the greatest probability of exceeding the standards will be selected.

(b) At the manufacturer's option, the Administrator will only select one vehicle to represent each engine family where the total projected annual sales for that family are less than 5,000 vehicles.

(c) A manufacturer may elect to operate and test additional vehicles which are identical to those selected by the Administrator. Written notice of a commitment to operate and test additional vehicles shall be given to the Administrator prior to the start of testing and not later than 30 days following notification of the test fleet selection. The results of tests performed by the manufacturer will be combined to determine deterioration factors.

Each vehicle must meet applicable standards when tested by the Administrator and when those results are projected to the useful life.

(d) In lieu of testing a test vehicle and submitting data therefore, a manufacturer may, with the prior written approval of the Administrator, submit exhaust emission data on a similar vehicle for which certification has previously been obtained or for which all applicable data has previously been submitted.

§ 86.422-78 Administrator's fleet.

The Administrator may require additional test vehicles identical in all material respects to vehicles selected in accordance with § 86.421. The number of vehicles selected shall not increase the size of the test fleet by more than 20 percent or one vehicle, whichever is greater.

§ 86.423-78 Test vehicles.

(a) At zero kilometres before testing or beginning to accumulate service on the test vehicle, the manufacturer shall provide the zero kilometre documents as required by the Administrator, and make the vehicle available for such testing or inspection as the Administrator may require. Testing or service accumulation shall not begin until authorized by the Administrator. Failure to comply with these requirements will invalidate all test data submitted for the vehicle.

(b) Once a manufacturer begins to operate a test vehicle, as indicated by compliance with paragraph (a) of this section, the data from the vehicle will be used, unless specified otherwise by the Administrator. Discontinuation of a vehicle shall be allowed only with the written consent of the Administrator.

(c) Test vehicles shall be calibrated at zero kilometres within the production tolerances applicable to the manufacturer's specifications.

(d) The Administrator may disqualify a vehicle which receives assembly line operations and adjustments which will not be performed on production vehicles.

§ 86.424-78 Service accumulation, testing and maintenance.

(a) Service accumulation, emission testing and maintenance are described in §§ 86.425 to 86.429. The testing and certification procedures are graphically depicted in Figure E78-2.

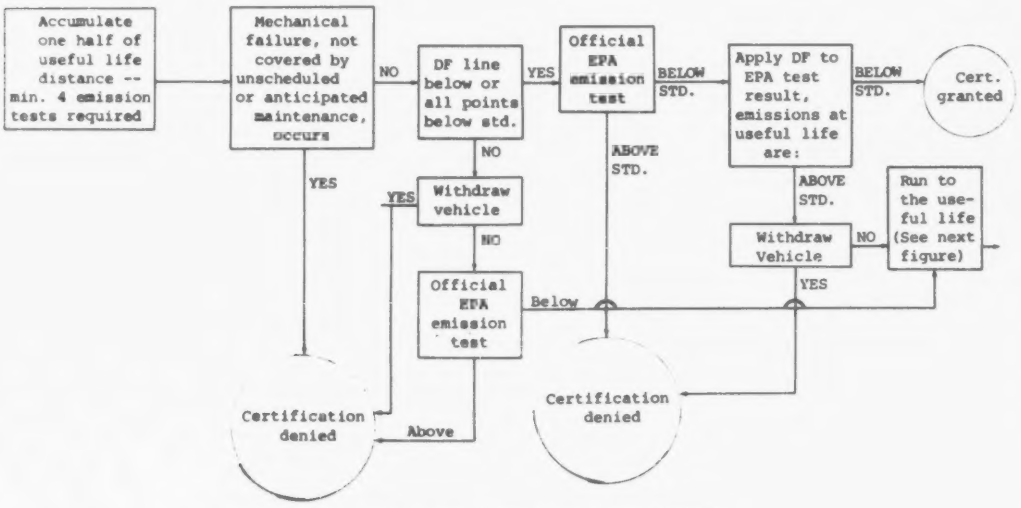

Figure E78-2 Testing and Certification

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§ 86.425-78 Test procedures.

(a) Motorcycle emission test procedures are found in Subpart F.

(b) The Administrator may prescribe emission test procedures for any motorcycle which he determines is not susceptible to satisfactory testing by the procedures set forth in Subpart F.

(c) Testing of any type with respect to any test vehicle other than that specified in this subpart and Subpart F is not allowed except as specifically authorized by the Administrator.

§ 86.426-78 Service accumulation.

(a) The procedure for service accumulation will be the Durability Driving Schedule as specified in Appendix IV to this part. A modified procedure may also be used if approved in advance by the Administrator. Except with the advance approval of the Administrator, all vehicles will accumulate distance at a measured curb mass which is within 5 kg (11.0 lb) of the loaded vehicle mass specified by the Administrator.

(b) During service accumulation, vehicles shall not be operated for more than 12 hours during an operating sequence. Engine shutdowns are permitted during the operating sequence, but the periods of shutdown are not included in the 12 hour total. Following each operating sequence, the vehicle shall soak, without operation, for a minimum of 8 hours. During soak periods, the vehicle shall be exposed to normal outside ambient temperatures and humidity conditions unless vehicle maintenance or servicing is being performed.

(c) The manufacturer's recommended shifting procedure will be used for laps 1 through 10. Lap 11 shifts (W.O.T. accelerations) must be conducted at the manufacturer's recommended maximum safe engine speed.

[42 FR 1126, Jan. 5, 1977, as amended at 42 FR 56737, Oct. 28, 1977]

§ 86.427-78 Emission tests.

(a) Each test vehicle shall be driven with all emission control systems installed and operating for the following total test distances, or for such lesser distance as the Administrator may agree to as meeting the objectives of this procedure. (See § 86.419 for class explanation).

Displacement class	Total test distance (kilometers)	Minimum test distance (kilometers)	Minimum number of tests
I	6,000	2,500	4
II	9,000	2,500	4
III	15,000	3,500	4

(b) All vehicles shall undergo at least four emission tests; one at the minimum test distance, one before and one after periodic maintenance, and one at the total test distance. If no maintenance is scheduled, then at least two tests will be performed, at equal intervals, between the minimum and total test distances. Additional tests may be performed; such tests must be at equal intervals and approved by the Administrator prior to starting service accumulation.

(c) Where the Administrator agrees to a lesser distance for service accumulation, he may modify the maintenance provisions of this subpart.

(d) All tests required by this subpart must be conducted at an accumulated distance within 250 kilometers (155 mi) of the nominal distance at each test point.

(e) Up to three valid tests may be conducted at each test point. The number of valid tests must be the same at each test point for a given vehicle.

(f) The Administrator may require that any one or more of the test vehicles be submitted to him, at such places as he may designate, for the purpose of conducting emissions tests. The Administrator may specify that he will conduct such testing at the manufacturer's facility, in which case instrumentation and equipment specified by the Administrator shall be made available by the manufacturer for test operations. Any testing conducted at a manufacturer's facility pursuant to this paragraph shall be scheduled by the manufacturer as promptly as possible.

(g) Whenever the Administrator conducts a test on a test vehicle, the results of that test, unless subsequently invalidated by the Administrator, shall

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comprise the data for the vehicle at that prescribed test point and the manufacturer's data for that prescribed test point shall not be used in determining compliance with emission standards.

§ 86.428-80 Maintenance, scheduled; test vehicles.

(a) Periodic maintenance on the engine, emission control system, and fuel system of test vehicles shall be scheduled for performance at the same distance intervals that will be specified in the manufacturer's maintenance instructions furnished to the ultimate purchaser. Such maintenance shall be performed only under the following provisions.

(b) Periodic major engine tune-ups to the manufacturer's specifications may be performed no more frequently than as follows nor may any tune-up be performed within 1000 km prior to the official test.

Displacement class	Minimum interval (kilometer)
I	3,000
II	3,000
III	4,000

(c) A scheduled major engine tune-up shall be restricted to items listed below and shall be conducted in a manner consistent with service instructions and specifications provided by the manufacturer for use by customer service personnel. The following items may be inspected, replaced, cleaned, adjusted, and/or serviced as required: (1) Breaker points, timing, (2) idle speed and idle air/fuel mixture, (3) valve lash, (4) engine bolt torque, and (5) spark plugs.

(d) The Administrator will specify the ignition timing, idle air fuel mixture and other fuel system adjustments to be used at each tune-up. The settings selected will be those the Administrator deems appropriate within the physically available range.

(e) Periodic change of engine and transmission oil, and change or service of oil, air, and fuel filters will be allowed at the same distance intervals that will be specified in the manufacturer's maintenance instructions.

(f) Requests for authorization of periodic maintenance of emission control related components not specifically authorized to be maintained by this section, and for anticipated maintenance (see § 86.428), must be made prior to the beginning of distance accumulation. The Administrator will approve the performance of such maintenance if the manufacturer makes a satisfactory showing that the maintenance will be performed on vehicles in use and that the maintenance is reasonable and necessary.

(1) The EGR system may be serviced a maximum of two times during the durability service accumulation if failure of the EGR system activates an audible and/or visual signal approved by the Administrator which alerts the vehicle operator to the need for EGR system maintenance, or if the need for periodic maintenance of the EGR system is overtly signalled to the vehicle operator by an appropriate means, e.g., an indicator light or significantly reduced driveability performance.

(2) The catalytic converter may be serviced only once during the durability service accumulation if failure of the catalytic converter activates an audible and/or visual signal approved by the Administrator which alerts the vehicle operator to the need for catalytic converter maintenance, or if the need for periodic maintenance of the catalytic converter is overtly signalled to the vehicle operator by an appropriate means, e.g., an indicator light or significantly reduced driveability performance.

(g) Certain engine components may require maintenance which, by its nature, cannot be scheduled for periodic intervals, but which the manufacturer believes will be necessary. For example, piston and cylinder replacement caused by piston seizure which results in the vehicle being inoperative; or in the case of two-stroke engines, decarbonization, the need for which is signalled to the vehicle operator by significantly reduce driveability performance. Such maintenance is designated anticipated maintenance. Anticipated maintenance must be identified by the manufacturer and approved as being appropriate by the Administrator prior to the start of

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service accumulation. The approximate distance at which the need for anticipated maintenance may arise must be specified in the application for certification.

(b) Complete emission tests (see Subpart F) are required, unless waived by the Administrator, before and after any vehicle maintenance which may reasonably be expected to affect emissions.

§ 86.429-78 Maintenance, unscheduled: test vehicles.

(a) Any unscheduled engine, emission control system, or fuel system adjustment, repair, removal, disassembly, cleaning, or replacement on vehicles shall be performed only with the advance approval of the Administrator.

(1) In the case of unscheduled maintenance, such approval will be given if the Administrator:

(i) Has made a preliminary determination that part failure or system malfunction, or the repair of such failure or malfunction, does not render the vehicle unrepresentative of vehicles in use, and does not require direct access to the combustion chamber, except for spark plug, fuel injection component, or removable prechamber removal or replacement; and

(ii) Has made a determination that the need for maintenance or repairs is indicated by an overt indication of malfunction such as persistent misfire, vehicle stall, overheating, fluid leakage, loss of oil pressure, or charge indicator warning.

(2) Emission measurements may not be used as a means of determining the need for unscheduled maintenance under paragraph (a)(1)(i) of this section.

(b) Repairs to vehicle components of test vehicles, other than the engine, emission control system, or fuel system, shall be performed only as a result of part failure, vehicle system malfunction, or with the advance approval of the Administrator.

(c) The Administrator shall be given the opportunity to verify the extent of an overt indication of part failure and/or vehicle malfunction (e.g., misfire, stall), or an activation of an audible and/or visual signal, prior to the performance of any maintenance to which such overt indication or signal is relevant under the provisions of this section.

(d) Equipment, instruments, or tools may not be used to identify malfunctioning, maladjusted, or defective engine components unless the same or equivalent equipment, instruments, or tools will be available at dealerships and other service outlets and

(1) Are used in conjunction with scheduled maintenance on such components, and

(2) Are used subsequent to the identification of a vehicle or engine malfunction, as provided in paragraph (a)(1) of this section for durability or emission data vehicles, or

(3) Unless specifically authorized by the Administrator

(e) If the Administrator determines that part failure or system malfunction occurrence and/or repair rendered the vehicle unrepresentative of vehicles in use, the vehicle shall not be used as a test vehicle.

(f) Complete emission tests are required, unless waived by the Administrator, before and after any vehicle maintenance which may reasonably be expected to affect emissions.

§ 86.430-78 Vehicle failure.

(a) Any test vehicle which incurs major mechanical failure necessitating disassembly of the engine shall not be used as a test vehicle. This prohibition does not apply to failures occurring after the official test at the total test distance.

§ 86.431-78 Data submission.

(a) Data from all tests (including voided tests) shall be air posted to the Administrator within 72 hours (or delivered within five working days). In addition, all test data shall be compiled and provided to the Administrator. Failure to comply with these requirements may invalidate all test data submitted for the test vehicle.

(b) The manufacturer shall furnish to the Administrator explanation for voiding any test. The Administrator will determine if voiding the test was appropriate based upon the explanation given by the manufacturer. If the

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Administrator determines that voiding the test was not appropriate, the Administrator may require that the data from that test be used in the calculation of the deterioration factor for emissions.

(c) When unscheduled or anticipated maintenance is performed, a complete record of all pertinent maintenance, including a preliminary engineering report of any malfunction diagnosis and the corrective action taken shall be included with the test data. A complete engineering report shall be delivered or air posted to the Administrator within 10 working days after the tests. In addition all test data and maintenance reports shall be compiled and provided to the Administrator.

(d) A complete record of all maintenance shall be supplied.

§ 86.432-78 Deterioration factor.

(a) Deterioration factors shall be developed for each test vehicle from the emission test results. A separate factor shall be developed for each pollutant. The applicable data to be used in calculating these factors are:

(1) The results from all valid tests conducted by the manufacturer or Administrator at scheduled test intervals.

(2) The results from tests conducted before and after scheduled maintenance unless specifically excluded by the Administrator.

(3) The results from tests conducted before and after unscheduled maintenance, if approval of the maintenance by the Administrator was conditioned on the data being used in the deterioration factor calculation.

(b) Emission results which are less than 0.10 g/km shall be considered to be 0.10 g/km for purposes of this section.

(c) Test results for each pollutant shall be plotted as a function of the service accumulated at the start of the emission test, rounded to the nearest kilometre. These results shall be correlated to a straight line, fit by the method of least squares.

(d) An exhaust emission deterioration factor will be calculated by dividing the predicted emissions at the useful life distance by the predicted emissions at the total test distance. Predicted emissions are obtained from the correlation developed in paragraph (c) of this section.

Factor = Predicted total distance emissions / Predicted total test distance emissions

These interpolated and extrapolated values shall be carried out to four places to the right of the decimal point before dividing one by the other to determine the deterioration factor. The results shall be rounded to three places to the right of the decimal point in accordance with ASTM E 29-67.

(e) Deterioration factors computed to be less than 1.000 shall be 1.000.

[42 FR 1126, Jan. 5, 1977, as amended at 42 FR 56737, Oct. 28, 1977]

§ 86.433-78 [Reserved]

§ 86.434-78 Official emission tests.

(a) At the conclusion of service accumulation, and after emission tests for deterioration, the vehicle shall receive an official emission test. The Administrator shall designate where this test will occur.

(b) The manufacturer may request a second official test. The results of the second test will be used to determine compliance.

(c) If the emission results from the official test exceed the standards (without correction for deterioration), certification will be denied.

§ 86.435-78 Extrapolated emission values.

(a) If the deterioration factor lines are below the standards between the minimum test distance and the useful life, or if all points used to generate the lines are below the standards, predicted useful life emissions shall be calculated. If not, the manufacturers may elect to withdraw the vehicle or accumulate additional service.

(b) The emission results of each pollutant obtained from the official test will be multiplied by the appropriate deterioration factor to determine useful life emissions.

(1) If the useful life emissions are below the standards, certification will be granted.

(2) If any of the useful life emissions exceed the emission standards, the ve-

hicle must (if not withdrawn) accumulate distance to the useful life.

§ 86.436-78 Additional service accumulation.

(a) Additional service up to the useful life will be accumulated under the same conditions as the initial service accumulation.

(b) New deterioration lines will be generated using all applicable test points (except the first official EPA test) up to the useful life. The same procedures for determining the original deterioration line will be used.

(c) The vehicle will receive a final EPA official test. The manufacturer may request a second test. The results of the second test will be used to determine compliance.

(d) To qualify for certification:

(1) The final EPA official test results must be below the standards, and

(2) The deterioration line must be below the standard at the minimum test distance and the useful life, or all points used to generate the line, must be below the standard.

(e) If the vehicle is unable to complete the total distance due to engine mechanical failure, certification will be granted if:

(1) The mechanical failure was anticipated, § 86.428, and

(2) A new deterioration line calculated using the procedure described in § 86.436-78(b) is below the standard at the minimum test distance and at the useful life, and,

(3) The results of the EPA official test, when adjusted by the new deterioration factor, are below the standards.

(f) The provisions of this section are graphically depicted in Figure E78-3.

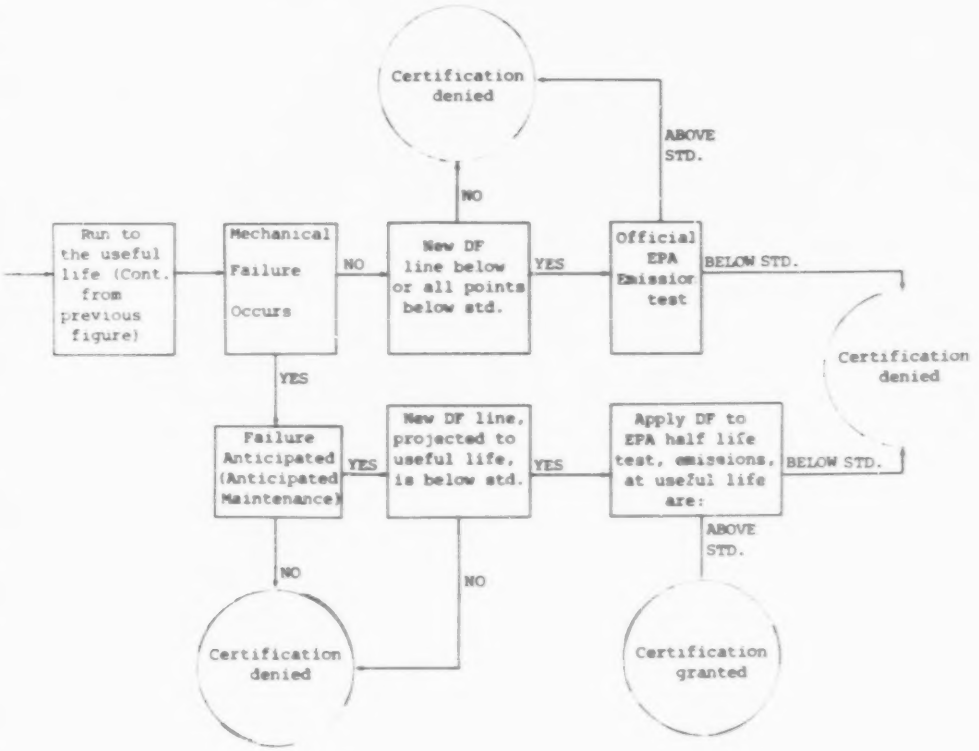

Figure E78-3 Additional Distance Accumulation

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§ 86.437-78 Certification.

(a) New motorcycles produced by a manufacturer whose projected sales in the United States is 10,000 or more units (for the model year in which certification is sought) are covered by the following:

(1) The manufacturer shall submit to the Administrator a statement that the test vehicles with respect to which data are submitted have been tested in accordance with the applicable test procedures, that they meet the requirements of such tests, and that, on the basis of such tests, they conform to the requirements of the regulations in this part. If such statements cannot be made with respect to any vehicle tested, the vehicle shall be identified, and all pertinent test data relating thereto shall be supplied.

(2)(i) If, after a review of the test reports and data submitted by the manufacturer, data derived from any inspection carried out under § 86.441 and any other pertinent data or information, the Administrator determines that a test vehicle(s) meets the requirements of the Act and of this subpart, he will issue a certificate of conformity with respect to such vehicle(s) except in cases covered by § 86.442.

(ii) Such certificate will be issued for such period not to exceed one model year as the Administrator may determine and upon such terms as he may deem necessary to assure that any new motorcycle covered by the certificate will meet the requirements of the act and of this subpart.

(iii) The certificate will cover all vehicles represented by the test vehicle and will certify compliance with no more than one set of applicable standards.

(3)(i) If, after a review of the test reports and data submitted by the manufacturer, data derived from any additional testing conducted pursuant to § 86.427, or information derived from any inspection carried out under § 86.441, or any other pertinent data or information, the Administrator determines that one or more test vehicles of the certification test fleet do not meet applicable standards, he will notify the manufacturer in writing, setting forth the basis for his determination. The manufacturer may request a hearing on the Administrator's determination.

(ii) The manufacturer may, at his option, proceed with any of the following alternatives with respect to any vehicles represented by a test vehicle(s) determined not in compliance with applicable standards:

(A) Request a hearing.

(B) Delete from the application for certification the vehicles represented by the failing test vehicle. (Vehicles so deleted may be included in a later request for certification under paragraph (b)(2)(iii) of this section.) The Administrator will then select in place of each failing vehicle an alternate vehicle chosen in accordance with selection criteria employed in selecting the vehicle that failed, or

(C) Repair the test vehicle and demonstrate by testing that it meets applicable standards. Another vehicle which is in all material respects the same as the first vehicle, as repaired, shall then be operated and tested in accordance with applicable test procedures.

(iii) If the manufacturer does not request a hearing or present the required data under subparagraph (2) of this paragraph, the Administrator will deny certification.

(b) New motorcycles produced by a manufacturer whose projected sales in the United States is less than 10,000 units (for the model year in which certification is sought) are covered by the following:

(1) The manufacturer shall submit to the Administrator an application for certification containing the following:

(i) A brief description of the vehicles to be covered by the certificate (the manufacturer's sales data book or advertising including specifications will satisfy this requirement for most manufacturers).

(ii) A statement signed by the authorized representative of the manufacturer stating: "The vehicles described herein have been tested in accordance with the provisions of Subpart E, Part 86, Title 40, of the Code of Federal Regulations, and on the basis of these tests are in conformance with that subpart. All of the data and records required by that subpart are

on file and are available for inspection by the Administrator. Total sales of vehicles subject to this subpart will be limited to less than 10,000 units."

(2) If, after a review of the statement the Administrator determines that the requirements of this subpart have been met, he will issue a certificate of conformity with respect to the described vehicles except in cases covered by § 86.442.

(3) Such certificate will be issued for such a period not to exceed one model year as the Administrator may determine and upon such terms as he may deem necessary to assure that any new motorcycle covered by the certificate will meet the requirements of the Act and of this subpart.

(4) The certificate will cover all vehicles described by the manufacturer.

(5)(i) If, after a review of the statements and descriptions submitted by the manufacturer, the Administrator determines that the applicable requirements have not been met, he will notify the manufacturer in writing, setting forth the basis for his determination. The manufacturer may request a hearing on the Administrator's determination.

(ii) If the manufacturer does not request a hearing or present the required information the Administrator will deny certification.

[42 FR 1126, Jan. 5, 1977, as amended at 42 FR 56738, Oct. 28, 1977; 46 FR 50496, Oct. 13, 1981]

§ 86.438–78 Amendments to the application.

(a) The manufacturer shall inform the Administrator by way of amendment to the application of any proposed changes to vehicles in production or additional vehicles to be produced. The Administrator will, if appropriate, select a new test vehicle. Except as provided in § 86.439, no changes may be instituted until approved by the Administrator.

(b) The Administrator may allow reduced testing.

§ 86.439–78 Alternative procedure for amending certificates of conformity.

(a) A manufacturer, in lieu of notifying the Administrator in advance of an addition of a vehicle under § 86.438, may notify him by appropriate amendment to the application for certification concurrently with implementation of the change or addition if the manufacturer determines on the basis of emission data that the addition or change will not adversely affect (cause to increase above the applicable standards) emissions from the affected vehicles. Upon such notification, the manufacturer may proceed to put the addition or change into effect. The applicable certificate of conformity then in effect will be deemed amended as set forth in the amended application unless and until the amendment is rejected by the Administrator under paragraph (c) of this section.

(b) The manufacturer may continue to produce vehicles as described in the amendment to the application for certification for a maximum of 30 days, unless the Administrator grants an extension in writing. This period may be shortened by a notification in accordance with paragraph (c) of this section.

(c) If the Administrator determines, based upon the description of the amendment to the application, that no additional test data will be required, he will notify the manufacturer in writing of the acceptability of the amended application. If the Administrator determines that additional test data will be required, he will so notify the manufacturer and proceed as in § 86.438.

(d) Election to produce vehicles under this section will be deemed to be a consent to recall all vehicles which the Administrator determines under § 86.438 do not meet applicable standards, and to cause such nonconformity to be remedied at no expense to the owner.

(e) Any changed or added vehicles produced after the manufacturer is notified of the rejected application amendment will not be covered by a certificate of conformity.

§ 86.440–78 Maintenance of records.

(a) The manufacturer of any motorcycle subject to any of the standards or procedures prescribed in this subpart shall establish, maintain and

retain the following adequately organized and indexed records:

(1) *General records.* (i)(A) Identification and description of all certification vehicles for which testing is required under this subpart.

(B) A description of all emission control systems which are installed on or incorporated in each certification vehicle.

(C) A description of all procedures used to test each such certification vehicle.

(ii) A properly completed application, following the format prescribed by the U.S. EPA for the appropriate year of production, fulfills each of the requirements of this paragraph.

(2) *Individual records.* (i) A brief history of each motorcycle used for certification under this subpart in the form of a separate booklet or other document for each separate vehicle in which shall be recorded:

(A) In the case where a current production engine is modified for use in a certification vehicle, a description of the process by which the engine was selected and of the modification made, giving specifically the place of modification and installation of the engine into the certification vehicle and the person(s) in charge of modification and installation. In the case where the engine for a certification vehicle is not derived from a current production engine, a general description of the build-up of the engine (e.g., experimental heads were cast and machined according to supplied drawings, etc.) giving specifically the place of engine assembly and installation into a certification vehicle and the person(s) in charge of engine assembly and installation. In both cases above, a description of the origin and selection process for the carburetor, fuel system, emission control system components, and exhaust after treatment device shall be included. The required descriptions shall specify the steps taken to assure that the certification vehicle with respect to its engine, drive train, fuel system, emission control system components, exhaust after treatment device, vehicle mass, or any other device or component that can reasonably be expected to influence exhaust emissions, will be represented of production vehicles, and that either all components and/or vehicle construction processes, component inspection and selection techniques, and assembly techniques employed in constructing such vehicles are reasonably likely to be implemented for production vehicles or that they are as closely analogous as practicable to planned construction and assembly processes.

(B) A complete record of all emission tests performed (except tests performed by EPA directly), including all individual worksheets and/or other documentation relating to each such test, or exact copies thereof; the date, time, purpose, and location of each test; the distance accumulated on the vehicle when the test began and ended; and the names of supervisory personnel responsible for the conduct of the test.

(C) The date and times of each service accumulation run, listing both the distance accumulated and the name of each rider or each operator of the automatic service accumulation device.

(D) If used, the record of any devices employed to record the speed and/or distance in relationship to time of the test vehicle.

(E) A record and description of all maintenance and other servicing performed, giving the date and time of the maintenance or service, the reason for it, the person authorizing it, and the names of supervisory personnel responsible for the conduct of the maintenance or service. The description shall indicate whether or not EPA specifically consented to the work and, if EPA did not, shall list the provision of this subpart which authorizes its performance.

(F) A record and description of each test performed to diagnose engine or emissions control system performance, giving the date and time of test, the reason for it, the person authorizing it, and the names of supervisory personnel responsible for the conduct of the test.

(G) The dates and times that the vehicle was idle in storage, in transit or transport, and required soak periods.

(H) A brief description of any significant events affecting the vehicle during any time in the period covered by the history not described by an

entry under one of the previous headings including such extraordinary events as vehicle accidents or rider speeding citations or warnings.

(ii) Each such history shall be started on the date that the first of any of the selection or build-up activities in paragraph (a)(2)(i)(A) of this section occurred with respect to the certification vehicle, shall be updated each time the operational status of the vehicle changes or additional work is performed on it, and shall be kept in a designated location.

(3) All records required to be maintained under this subpart shall be retained by the manufacturer for a period of six (6) years after issuance of all certificates of conformity to which they relate. Records may be retained as hard copy or reduced to microfilm, punch cards, etc., depending on the record retention procedures of the manufacturer: *Provided*, That in every case all the information contained in the hard copy shall be retained.

[42 FR 1126, Jan. 5, 1977, as amended at 42 FR 56738, Oct. 28, 1977]

§ 86.441-78 Right of entry.

(a) Any manufacturer who has applied for certification of a new motorcycle subject to certification tests under this Subpart shall admit or cause to be admitted any EPA Enforcement Officer during operating hours on presentation of any credentials to any of the following:

(1) Any facility where any such tests or any procedures or activities connected with such tests are or were performed.

(2) Any facility where any new motorcycle which is being, was or is to be tested is present.

(3) Any facility where any construction process or assembly process used in the modification or build-up of such a vehicle into a certification vehicle is taking place or has taken place.

(4) Any facility where any record or other document relating to any of the above is located.

(b) Upon admission to any facility referred to in paragraph (c)(1) of this section, any EPA Enforcement Officer shall be allowed:

(1) To inspect and monitor any part or aspect of such procedures, activities, and testing facilities, including, but not limited to, monitoring vehicle preconditioning, emissions tests and service accumulation, maintenance, and vehicle soak and storage procedures; and to verify correlation or calibration of test equipment;

(2) To inspect and make copies of any such records, designs, or other documents; and

(3) To inspect and/or photograph any part or aspect of any such certification vehicle and any components to be used in the construction thereof.

(c) In order to allow the Administrator to determine whether or not production motorcycles conform in all material respects to the design specifications which applied to those vehicles described in the application for certification for which a certificate of conformity has been issued and to standards prescribed under section 202 of the Act, any manufacturer shall admit any EPA Enforcement Officer on presentation of credentials to both:

(1) Any facility where any document design, or procedure relating to the translation of the design and construction of engines and emission related components described in the application for certification or used for certification testing into production vehicles is located or carried on; and

(2) Any facility where any motorcycles to be introduced into commerce are manufactured or assembled.

(d) On admission to any such facility referred to in paragraph (c)(3) of this section, any EPA Enforcement Officer shall be allowed:

(1) To inspect and monitor any aspects of such manufacture or assembly and other procedures;

(2) To inspect and make copies of any such records, documents or designs; and

(3) To inspect and photograph any part or aspect of any such new motorcycles and any component used in the assembly thereof that are reasonably related to the purpose of his entry.

(e) Any EPA Enforcement Officer shall be furnished by those in charge of a facility being inspected with such reasonable assistance as he may request to help him discharge any function listed in this paragraph. Each applicant for or recipient of certification

is required to cause those in charge of a facility operated for its benefit to furnish such reasonable assistance without charge to EPA whether or not the applicant controls the facility.

(f) The duty to admit or cause to be admitted any EPA Enforcement Officer applies whether or not the applicant owns or controls the facility in question and applies both to domestic and to foreign manufacturers and facilities. EPA will not attempt to make any inspections which it has been informed that local law forbids. However, if local law makes it impossible to do what is necessary to insure the accuracy of data generated at a facility, no informed judgment that a vehicle or engine is certifiable or is covered by a certificate can properly be based on that data. It is the responsibility of the manufacturer to locate its testing and manufacturing facilities in jurisdictions where this situation will not arise.

(g) For purposes of this section:

(1) "Presentation of credentials" shall mean display of the document designating a person as an EPA Enforcement Officer.

(2) Where vehicle, component, or engine storage areas or facilities are concerned, "operating hours" shall mean all times during which personnel other than custodial personnel are at work in the vicinity of the area or facility and have access to it.

(3) Where facilities or areas other than those covered by paragraph (g)(2) of this section are concerned, "operating hours" shall mean all times during which an assembly line is in operation or all times during which testing, maintenance, service accumulation, production or compilation of records, or any other procedure or activity related to certification testing, to translation of designs from the test stage to the production stage, or to vehicle manufacture or assembly is being carried out in a facility.

(4) "Reasonable assistance" includes, but is not limited to, clerical, copying, interpretation and translation services, the making available on request of personnel of the facility being inspected during their working hours to inform the EPA Enforcement Officer of how the facility operates and to answer his questions, and the performance on request of emissions tests on any vehicle which is being, has been, or will be used for certification testing. Such tests shall be nondestructive, but may require appropriate service accumulation. A manufacturer may be compelled to cause the personal appearance of any employee at such a facility before an EPA Enforcement Officer by written request for his appearance, signed by the Assistant Administrator for Enforcement, served on the manufacturer. Any such employee who has been instructed by the manufacturer to appear will be entitled to be accompanied, represented, and advised by counsel. No counsel who accompanies, represents, or advises an employee compelled to appear may accompany, represent, or advise any other person in the investigation.

(5) Any entry without 24 hours prior written or oral notification to the affected manufacturer shall be authorized in writing by the Assistant Administrator for Enforcement.

§ 86.442-78 Denial, revocation, or suspension of certification.

(a) Notwithstanding the fact that any certification vehicle(s) may comply with other provisions of this subpart, the Administrator may withhold or deny the issuance of a certificate of conformity (or suspend or revoke any such certificate which has been issued) with respect to any such vehicle(s) if:

(1) The manufacturer submits false or incomplete information in his application for certification thereof; or

(2) The manufacturer renders inaccurate or invalid any test data which he submits pertaining thereto or otherwise circumvents the intent of the Act or of this subpart with respect to such vehicle; or

(3) Any EPA Enforcement Officer is denied access on the terms specified in § 86.441 to any facility or portion thereof which contains any of the following:

(i) The vehicle, or

(ii) Any components used or considered for use in its modification or build-up into a certification vehicle, or

(iii) Any production vehicle which is or will be claimed by the manufacturer to be covered by the certificate, or

(iv) Any step in the construction of a vehicle described in paragraph (c) of this section, or

(v) Any records, documents, reports, or histories required by this Part to be kept concerning any of the above.

(4) Any EPA Enforcement Officer is denied "reasonable assistance" (as defined in § 86.444) in examining any of the items listed in paragraph (a)(1)(iii) of this section.

(b) The sanctions of withholding, denying, revoking, or suspending of a certificate may be imposed for the reasons in paragraph (a) of this section only when the infraction is substantial.

(c) In any case in which a manufacturer knowingly submits false or inaccurate information, or knowingly renders inaccurate or invalid any test data, or commits any fraudulent acts and such acts contribute substantially to the Administrator's decision to issue a certificate of conformity, the Administrator may deem such certificate void ab initio.

(d) In any case in which certification of a vehicle is proposed to be withheld, denied, revoked, or suspended under paragraphs (a)(3) or (a)(4) of this section, and in which the Administrator has presented to the manufacturer involved reasonable evidence that a violation of § 86.441 in fact occurred, the manufacturer, if the wishes to contend that, even though the violation occurred, the vehicle in question was not involved in the violation to a degree that would warrant withholding, denial, revocation, or suspension of certification under either paragraphs (a)(3) or (a)(4) of this section, shall have the burden of establishing that contention to the satisfaction of the Administrator.

(e) Any revocation or suspension of certification under paragraph (a) of this section shall:

(1) Be made only after the manufacturer concerned has been offered an opportunity for a hearing conducted in accordance with § 86.444 hereof.

(2) Extend no further than to forbid the introduction into commerce of vehicles previously covered by the certification which are still in the hands of the manufacturer, except in cases of such fraud or other misconduct as makes the certification invalid ab initio.

(f) The manufacturer may request in the form and manner specified in § 86.443 that any determination made by the Administrator under paragraph (a) of this section to withhold or deny certification be reviewed in a hearing conducted in accordance with § 86.444. If the Administrator finds, after a review of the request and supporting data, that the request raises a substantial factual issue, he will grant the request with respect to such issue.

[42 FR 1126, Jan. 5, 1977, as amended at 42 FR 56738, Oct. 28, 1977]

§ 86.443-78 Request for hearing.

Within 30 days following receipt of notification that an application has been rejected or that certification has been denied, the manufacturer may request a hearing on the Administrator's determination. The request shall be in writing, signed by an authorized representative of the manufacturer and shall include a statement specifying the manufacturer's objections to the Administrator's determinations, and data in support of such objections. If, after the review of the request and supporting data, the Administrator finds that the request raises a substantial factual issue, he shall provide the manufacturer a hearing with respect to such issue.

§ 86.444-78 Hearings on certification.

(a)(1) After granting a request for a hearing under § 86.443 the Administrator will designate a Presiding Officer for the hearing.

(2) The General Counsel will represent the Environmental Protection Agency in any hearing under this section.

(3) If a time and place for the hearing have not been fixed by the Administrator under § 86.443, the hearing shall be held as soon as practicable at a time and place fixed by the Administrator or by the Presiding Officer.

(4) In the case of any hearing requested pursuant to § 86.437, the Administrator may in his discretion

direct that all argument and presentation of evidence be concluded within such fixed period not less than 30 days as he may establish from the date that the first written offer of a hearing is made to the manufacturer. To expedite proceedings, the Administrator may direct that the decision of the Presiding Officer (who may, but need not be the Administrator himself) shall be the final EPA decision.

(b)(1) Upon his appointment pursuant to paragraph (a) of this section, the Presiding Officer will establish a hearing file. The file shall consist of the notice issue by the Administrator under a hearing and the supporting data submitted therewith and all documents relating to the request for certification and all documents submitted therewith, and correspondence and other data material to the hearing.

(2) The appeal file will be available for inspection by the applicant at the office of the Presiding Officer.

(c) An applicant may appear in person, or may be represented by counsel or by any other duly authorized representative.

(d)(1) The Presiding Officer upon the request of any party, or in his discretion, may arrange for a prehearing conference at a time and place specified by him to consider the following:

(i) Simplification of the issues;

(ii) Stipulations, admissions of fact, and the introduction of documents;

(iii) Limitation of the number of expert witnesses;

(iv) Possibility of agreement disposing of all or any of the issues in dispute;

(v) Such other matters as may aid in the disposition of the hearing, including such additional tests as may be agreed upon by the parties.

(2) The results of the conference shall be reduced to writing by the Presiding Officer and made part of the record.

(e)(1) Hearings shall be conducted by the Presiding Officer in an informal but orderly and expeditious manner. The parties may offer oral or written evidence, subject to the exclusion by the Presiding Officer of irrevelant, immaterial, and repetitious evidence.

(2) Witnesses will not be required to testify under oath. However, the Presiding Officer shall call to the attention of witnesses that their statements may be subject to the provisions of Title 18 U.S.C. 1001 which imposes penalties for knowingly making false statements or representations, or using false documents in any matter within the jurisdiction of any department or agency of the United States.

(3) Any witness may be examined or cross-examined by the Presiding Officer, the parties, or their representatives.

(4) Hearings shall be reported verbatim. Copies of transcripts of proceedings may be purchased by the applicant from the reporter.

(5) All written statements, charts, tabulations, and similar data offered in evidence at the hearing shall, upon a showing satisfactory to the Presiding Officer of their authenticity, relevancy, and materiality, be received in evidence and shall constitute a part of the record.

(6) Oral argument may be permitted in the discretion of the Presiding Officer and shall be reported as part of the record unless otherwise ordered by him.

(f)(1) The Presiding Officer shall make an initial decision which shall include written findings and conclusions and the reasons or basis therefore on all the material issues of fact, law, or discretion presented on the record. The findings, conclusions, and written decision shall be provided to the parties and made a part of the record. The initial decision shall become the decision of the Administrator without further proceedings unless there is an appeal to the Administrator or motion for review by the Administrator within 20 days of the date the initial decision was filed.

(2) On appeal from or review of the initial decision the Administrator shall have all the powers which he would have in making the initial decision including the discretion to require or allow briefs, oral argument, the taking of additional evidence or the remanding to the Presiding Officer for additional proceedings. The decision by the Administrator shall include written findings and conclusions and the

reasons or basis therefore on all the material issues of fact, law, or discretion presented on the appeal or considered in the review.

Subpart F—Emission Regulations for 1978 and Later New Motorcycles; Test Procedures

SOURCE: 42 FR 1137, Jan. 5, 1977, unless otherwise noted.

§ 86.501-78 Applicability.

(a) This subpart contains the motorcycle test procedures specified in Subpart E.

(b) Provisions of this subpart apply to tests performed by both the Administrator and motor vehicle manufacturers.

§ 86.502-78 Definitions.

(a) The definitions in § 86.402-78 apply to this subpart.

§ 86.503-78 Abbreviations.

(a) The abbreviations in § 86.403-78 apply to this subpart.

§ 86.504-78 Section numbering.

(a) The section numbering system described in § 86.404-78 is used in this subpart.

§ 86.505-78 Introduction; structure of subpart.

(a) This subpart describes the equipment required and the procedures to follow in order to perform exhaust emission tests on motorcycles. Subpart E sets forth the testing requirements and test intervals necessary to comply with EPA certification procedures.

(b) Three topics are addressed in this subpart. Sections 86.508 through 86.515 set forth specifications and equipment requirements; §§ 86.516 through 86.526 discuss calibration methods and frequency; test procedures and data requirements are listed (in approximate order of performance) in §§ 86.527 through 86.544.

§§ 86.506—86.507 [Reserved]

§ 86.508-78 Dynamometer.

(a) The dynamometer shall have a single roll with a diameter of at least 0.400 metre.

(b) The dynamometer shall be equipped with a roll revolution counter for measuring actual distance traveled.

(c) Flywheels or other means shall be used to stimulate the inertia specified in § 86.529.

(d) A variable speed cooling blower shall direct air to the vehicle. The blower outlet shall be at least 0.40 m^2 (4.31 ft^2) and shall be squarely positioned between 0.3 m (0.98 ft) and 0.45 m (1.48 ft) in front of the vehicle's front wheel. The velocity of the air at the blower outlet shall be within the following limits (as a function of roll speed):

Actual roll speed	Allowable cooling air speed
0 km/h to 5 km/h	0 km/h to 10 km/h.
5 km/h to 10 km/h	0 km/h to roll speed + 5 km/h.
10 km/h to 50 km/h	Roll speed ± 5 km/h.
50 km/h to 70 km/h	Roll speed ± 10 pct.
Above 70 km/h	At least 63 km/h.

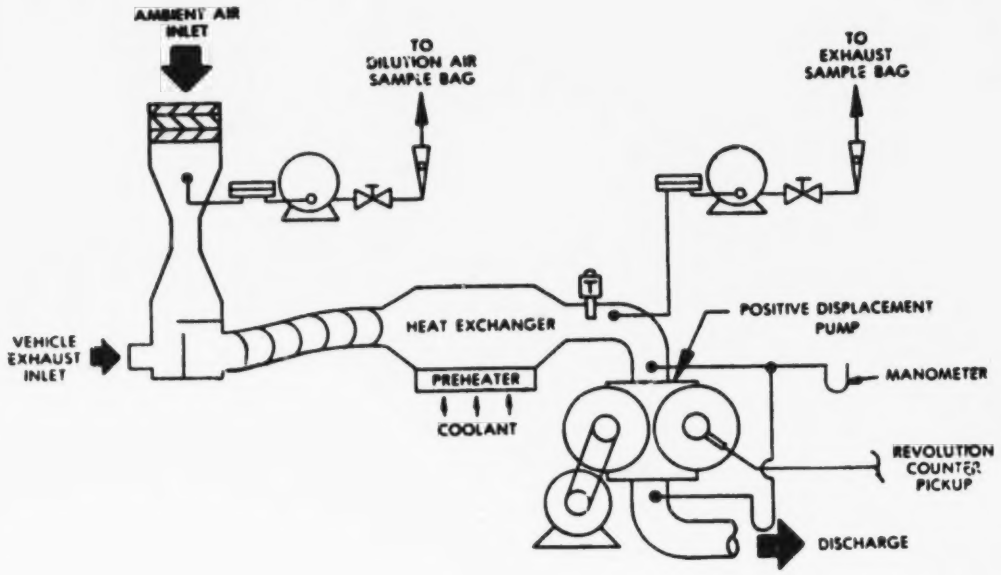
(e) The dynamometer shall comply with the tolerances in § 86.529.

[42 FR 1137, Jan. 5, 1977, as amended at 42 FR 56738, Oct. 28, 1977]

§ 86.509-78 Exhaust gas sampling system.

(a)(1) *General.* The exhaust gas sampling system is designed to measure the true mass emissions of vehicle exhaust. In the CVS concept of measuring mass emissions, two conditions must be satisfied: The total volume of the mixture of exhaust and dilution air must be measured, and a continuously proportioned sample of volume must be collected for analysis. Mass emissions are determined from the sample concentration and totalized flow over the test period.

(2) *Positive Displacement Pump.* The Positive Displacement Pump-Constant Volume Sample (PDP-CVS), Figure F78-1, satisfies the first condition by metering at a constant temperature and pressure through the pump. The total volume is measured by counting the revolutions made by the calibrated positive displacement pump. The proportional sample is achieved by sampling at a constant flow rate.



(SEE FIG. F78-3 FOR SYMBOL LEGEND)
FIGURE F78-1—EXHAUST GAS SAMPLING SYSTEM (PDP-CVS)

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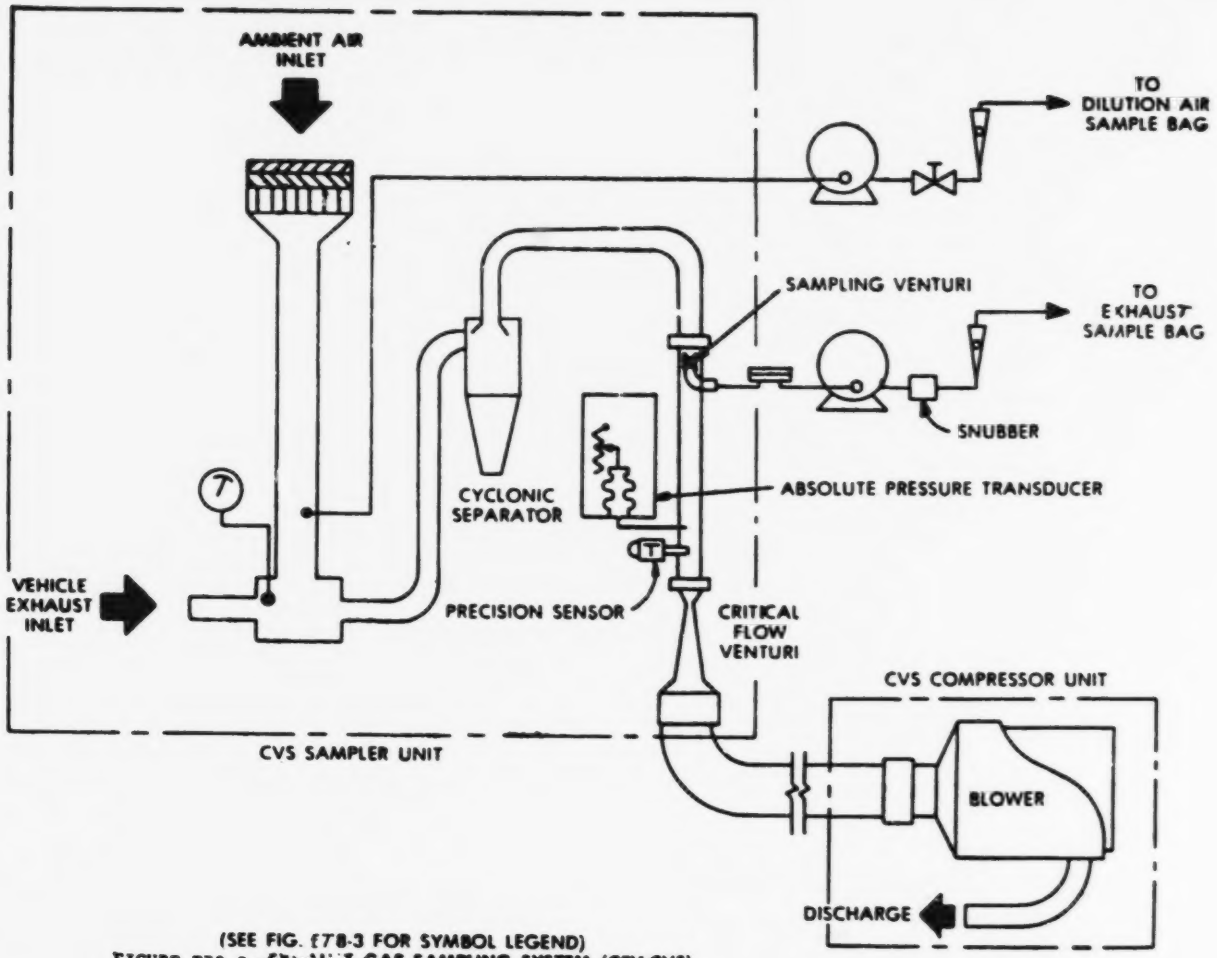

(SEE FIG. F78-3 FOR SYMBOL LEGEND)

FIGURE F78-2 –EXHAUST GAS SAMPLING SYSTEM (CFV-CVS)

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(3) *Critical Flow Venturi.* The operation of the Critical Flow Venturi-Constant Volume Sampler (CFV-CVS), Figure F78-2, is based upon the principles of fluid dynamics associated with critical flow. Proportional sampling is maintained by use of a small CFV in the sample line, which responds to the varying temperatures in the same manner as the main CFV. Total flow per test phase is determined by continuously computing and integrating instantaneous flow. A low response time temperature sensor is necessary for accurate flow calculation.

(4) [Reserved]

(5) *Other systems.* Other sampling systems may be used if shown to yield equivalent results, and if approved in advance by the Administrator (e.g., a heat exchanger with the CFV-CVS or an electronic flow integrator without a heat exchanger, with the PDP-CVS).

(b) *Component description, PDP-CVS.* The PDP-CVS, Figure F78-1, consists of a dilution air filter and mixing assembly, heat exchanger, positive displacement pump, sampling system, and associated valves, pressure and temperature sensors. The PDP-CVS shall conform to the following requirements:

(1) Static pressure variations at the tailpipe(s) of the vehicle shall remain within ±1.25 kPa (±5.02 in. H_2O) of the static pressure variations measured during a dynamometer driving cycle with no connection to the tailpipe(s). (Sampling systems capable of maintaining the static pressure to within ±0.25 kPa (±1.00 in H_2O) will be used by the Administrator if a written request substantiates the need for this closer tolerance.)

(2) The gas mixture temperature, measured at a point immediately ahead of the positive displacement pump, shall be within ±5° C (9° F) of the designed operating temperature at the start of the test. The gas mixture temperature variation from its value at the start of the test shall be limited to ±5° C (9° F) during the entire test. The temperature measuring system shall have an accuracy and precision of ±1° C (1.8° F).

(3) The pressure gauges shall have an accuracy and precision of ±0.4 kPa (3 mm Hg).

(4) The location of the dilution air inlet shall be placed and the flow capacity of the CVS shall be large enough to virtually eliminate water condensation in the system.

(5) Sample collection bags for dilution air and exhaust samples shall be of sufficient size so as not to impede sample flow.

(c) *Component description, CFV-CVS.* The CFV-CVS, Figure F78-2, consists of a dilution air filter and mixing assembly, cyclone particulate separator, sampling venturi, critical flow venturi, sampling system, and assorted valves, pressure and temperature sensors. The CFV-CVS shall conform to the following requirements:

(1) Static pressure variations at the tailpipe(s) of the vehicle shall remain within ±1.25 kPa (5.02 in H_2O) of the static pressure variations measured during a dynamometer driving cycle with no connection to the tailpipe(s). (Sampling systems capable of maintaining the static pressure to within ±0.25 kPa (1.00 in H_2O) will be used by the Administrator if a written request substantiates the need for this closer tolerance.)

(2) The temperature measuring system shall have an accuracy and precision of ±1° C (1.8° F) and a response time of 0.100 s to 62.5 percent of a temperature change (as measured in hot silicone oil).

(3) The pressure measuring system shall have an accuracy and precision of ±0.4 kPa (3 mm Hg).

(4) The location of the dilution air inlet shall be placed and the flow capacity of the CVS shall be large enough to virtually eliminate water condensation in the system.

(5) Sample collection bags for dilution air and exhaust samples shall be of sufficient size so as not to impede sample flow.

§ 86.510 [Reserved]

§ 86.511-78 Exhaust gas analytical system.

(a) *Schematic drawing.* Figure F78-3 is a schematic drawing of the exhaust gas analytical system. Since various configurations can produce accurate results, exact conformance with this drawing is not required. Additional components such as instruments,

valves, solenoids, pumps, and switches may be used to provide additional information and coordinate the functions of the component systems.

(b) *Major component description.* The analytical system, Figure F78-3, consists of a flame ionization detector (FID) for the determination of hydrocarbons, nondispersive infrared analyzers (NDIR) for the determination of carbon monoxide and carbon dioxide, and, if oxides of nitrogen are measured, a chemiluminescence analyzer (CL) for the determination of oxides of nitrogen. The exhaust gas analytical system shall conform to the following requirements:

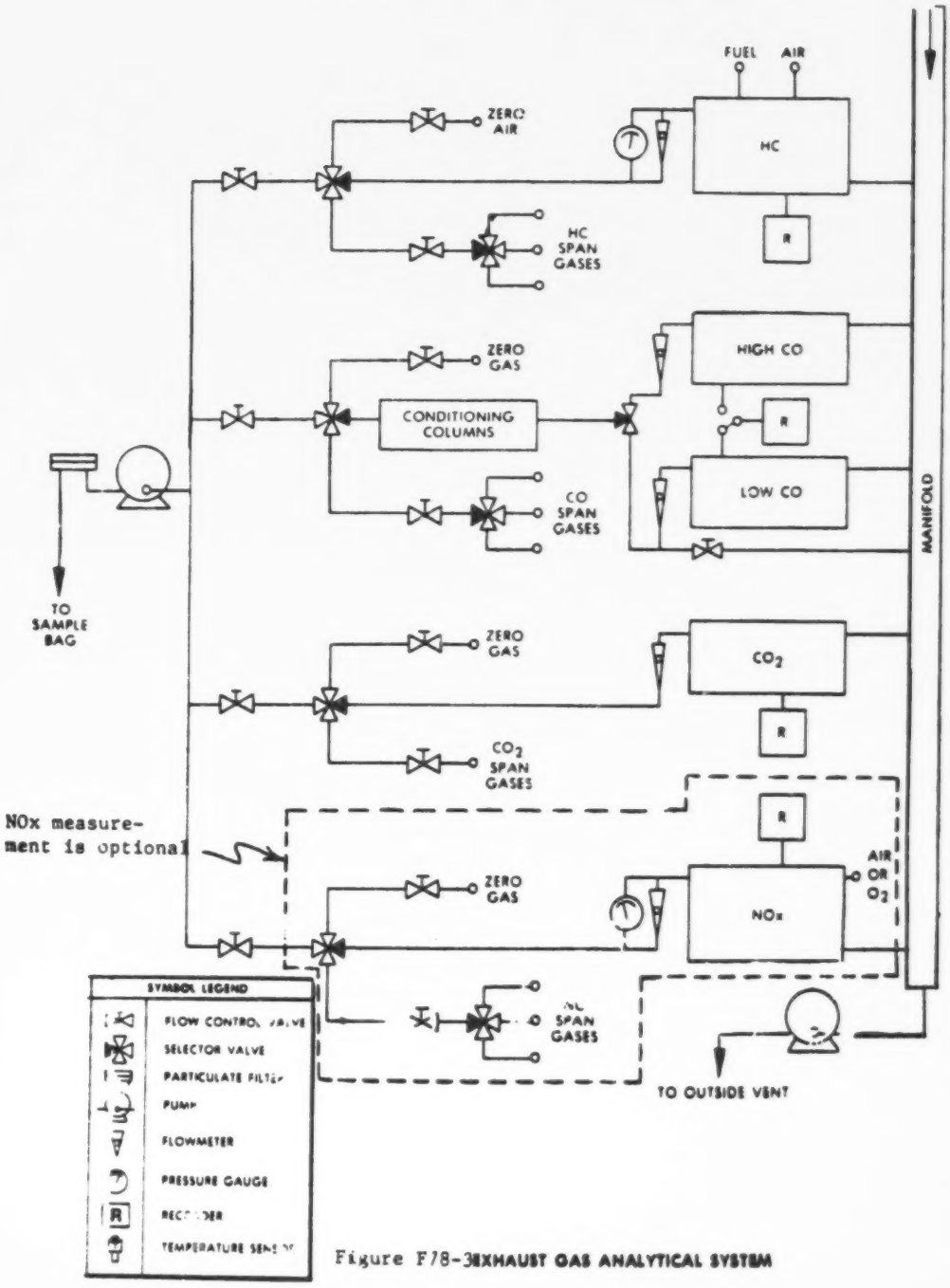

Figure F78-3 EXHAUST GAS ANALYTICAL SYSTEM

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(1) The chemiluminescence analyzer requires that the nitrogen dioxide present in the sample be converted to nitric oxide before analysis. Other types of analyzers may be used if shown to yield equivalent results and if approved in advance by the Administrator.

(2) The carbon monoxide (NDIR) analyzer may require a sample conditioning column containing $CaSO_4$, or indicating silica gel to remove water vapor and containing ascarite to remove carbon dioxide from the CO analysis stream.

(i) If CO instruments which are essentially free of CO_2 and water vapor interference are used, the use of the conditioning column may be deleted, see § 86.522 and § 86.544.

(ii) A CO instrument will be considered to be essentially free of CO_2 and water vapor interference if its response to a mixture of 3 percent CO_2 in N_2 which has been bubbled through water at room temperature produces an equivalent CO response, as measured on the most sensitive CO range, which is less than 1 percent of full scale CO concentration on ranges above 300 ppm full scale or less than 3 ppm on ranges below 300 ppm full scale, see § 86.522.

(c) *Other analyzers and equipment.* Other types of analyzers and equipment may be used if shown to yield equivalent results and if approved in advance by the Administrator.

§ 86.512 [Reserved]

§ 86.513-82 Fuel and engine lubricant specifications.

(a) Gasoline having the following specifications will be used by the Administrator in exhaust emission testing. Gasoline having the following specifications or substantially equivalent specifications approved by the Administrator, shall be used by the manufacturer for emission testing except that the lead and octone specifications do not apply.

Item designation	ASTM	Leaded	Unleaded
Octane, research, minimum	D2699	100	96.
PB (organic), grams/litre		0.370 (1.4) min	0.000-0.013.
(grams/U.S. gallon)			(0.00-0.05).
Distillation Range	D86		
IBP, C (F)		23.9-35 (75-95)	23.9-35 (75-95)
10 pct point, C (F)		48.9-57.2	48.9-57.2.
		(120-135)	(120-135).
50 pct point, C (F)		93.3-110	93.3-110.
		(200-230)	(200-230).
90 pct point, C (F)		148.9-162.8	148.9-162.8
		(300-325)	(300-325).
EP, C (F) (maximum)		212.8 (415)	212.8 (415).
Sulfur, weight percent, maximum	D1266	0.10	0.10.
Phosphorus, grams/litre (grams/U.S. gallon), maximum		0.0026 (0.01)	0.0013 (0.005).
RVP, KPa (psi)	D323	55.2-63.4	55.2-63.4
		(8.0-9.2)	(8.0-9.2).
Hydrocarbon composition:			
Olefins, percent, maximum	D1319	10	10.
Aromatics, percent maximum		35	35.
Saturates		Remainder	Remainder.

(b) Gasoline and engine lubricants representative of commercial fuels and engine lubricants which will be generally available through retail outlets shall be used in service accumulation. For leaded fuel the minimum lead content shall be equal to the average lead content found in regular leaded gasoline in the fuel survey prescribed by the Administrator. Where the Administrator determines that vehicles represented by a test vehicle will be operated using gasoline of different lead content than that prescribed in this paragraph, he may consent in writing to use a gasoline with a different lead content. The octane rating of the gasoline used shall be no higher than 4.0 research octane numbers above the minimum recommended by the manufacturer. The Reid Vapor Pressure of the fuel used shall be characteristic of

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the motor fuel during the season which the service accumulation takes place. If the manufacturer specifies several lubricants to be used by the ultimate purchaser, the Administrator will select one to be used during service accumulation.

(c) The specification range of the fuels and engine lubricants to be used under paragraph (b) of this section shall be reported in accordance with § 86.416.

(d) The same lubricant(s) shall be used for both service accumulation and emission testing.

(e) Fuels not meeting the specifications set forth in this section may be used only with the advance approval of the Administrator.

[46 FR 50496, Oct. 13, 1981]

§ 86.514-78 Analytical gases.

(a) Analyzer gases.

(1) Gases for the CO and CO_2 analyzers shall be single blends of CO and CO_2 respectively using nitrogen as the diluent.

(2) Gases for the hydrocarbon analyzer shall be single blends of propane using air as the diluent.

(3) Gases for the NOx analyzer shall be single blends of NO named as NOx with a maximum NO_2 concentration of 5 percent of the nominal value using nitrogen as the diluent.

(4) [Reserved]

(5) The allowable zero gas (air or nitrogen) impurity concentrations shall not exceed 1 ppm equivalent carbon response, 1 ppm carbon monoxide, 0.04 percent (400 ppm) carbon dioxide, and 0.1 ppm nitric oxide.

(6) "Zero grade air" includes artificial "air" consisting of a blend of nitrogen and oxygen with oxygen concentrations between 18 and 21 mole percent.

(7) The use of proportioning and precision blending devices to obtain the required analyzer gas concentrations is allowable provided their use has been approved in advance by the Administrator.

(b) Calibration gases shall be known to within ±2 percent of the true values.

§ 86.515-78 EPA Urban Dynamometer Driving Schedule.

(a) The dynamometer driving schedules are listed in Appendix I. The driving schedules are defined by a smooth trace drawn through the specified speed vs. time relationships. They consist of a nonrepetitive series of idle, acceleration, cruise, and deceleration modes of various time sequences and rates. Appropriate driving schedules are as follows:

Class I—Appendix I(c)
Class II—Appendix I(b)
Class III—Appendix I(b)

(b) The speed tolerance at any given time on the dynamometer driving schedule prescribed in Appendix I or as printed on a driver's aid chart approved by the Administrator, when conducted to meet the requirements of § 86.537 is defined by upper and lower limits. The upper limit is 3.2 km/h (2 mph) higher than the highest point on the trace within 1 second of the given time. The lower limit is 3.2 km/h (2 mph) lower than the lowest point on the trace within 1 second of the given time. Speed variations greater than the tolerances (such as may occur during gear changes) are acceptable provided they occur for less than 2 seconds on any occasion. Speeds lower than those prescribed are acceptable provided the vehicle is operated at maximum available power during such occurrences. When conducted to meet the requirements of § 86.532 the speed tolerance shall be as specified above, except that the upper and lower limits shall be 6.4 km/h (4 mph).

(c) Figure F78-4 shows the range of acceptable speed tolerances for typical points. Figure F78-4(a) is typical of portions of the speed curve which are increasing or decreasing throughout the two second time interval. Figure F78-4(b) is typical of portions of the speed curve which include a maximum or minimum value.

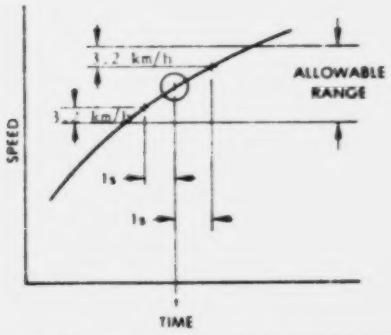

FIGURE F78-4a—DRIVERS TRACE, ALLOWABLE RANGE

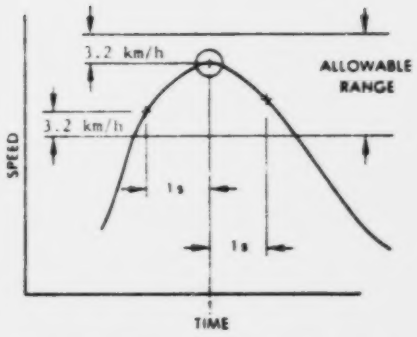

FIGURE F78-4b—DRIVERS TRACE, ALLOWABLE RANGE

§ 86.516–78 Calibrations, frequency and overview.

(a) Calibrations shall be performed as specified in §§ 86.517 through 86.526.

(b) [Reserved]

(c) At least monthly or after any maintenance which could alter calibration, the following calibrations and checks shall be performed:

(1) Calibrate the hydrocarbon analyzer, carbon dioxide analyzer, carbon monoxide analyzer, and, if oxides of nitrogen are measured, oxides of nitrogen analyzer.

(2) Calibrate the dynamometer. If the dynamometer receives a weekly performance check (and remains within calibration), the monthly calibration need not be performed.

(d) At least weekly or after any maintenance which could alter calibration, the following calibrations and checks shall be performed:

(1) Check the oxides of nitrogen converter efficiency, if oxides of nitrogen are measured, and

(2) Perform a CVS system verification, and

(3) Run a performance check on the dynamometer. This check may be omitted if the dynamometer has been calibrated within the preceding month.

(e) The CVS positive displacement pump or Critical Flow Venturi shall be calibrated following initial installation, major maintenance or as necessary when indicated by the CVS system verification (described in § 86.519).

(f) Sample conditioning columns, if used in the CO analyzer train, should be checked at a frequency consistent with observed column life or when the indicator of the column packing begins to show deterioration.

§ 86.517 [Reserved]

§ 86.518–78 Dynamometer calibration.

(a) The dynamometer shall be calibrated at least once each month or performance verified at least once each week and then calibrated as required. The dynamometer is driven above the test speed range. The device used to drive the dynamometer is then disengaged from the dynamometer and the roll is allowed to coast down. The kinetic energy of the system is dissipated by the dynamometer. This method neglects the variations in roll bearing friction due to the drive axle weight of the vehicle.

(b) Calibration shall consist of coasting down the dynamometer for each inertia load combination used. Coastdown times for the interval from 70 to 60 km/h shall be within the tolerances specified in § 86.529. The dynamometer adjustments necessary to produce these results shall be noted for future reference.

(c) The performance check consists of conducting a dynamometer coastdown at one or more inertia-horsepower settings and comparing the coastdown time to the table in Figure F78–9 of § 86.529–78. If the coastdown time is

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outside the tolerance, a new calibration is required.

§ 86.519-78 Constant volume sampler calibration.

The CVS (Constant Volume Sampler) is calibrated using an accurate flowmeter and restrictor valve. Measurements of various parameters are made and related to flow through the unit. Procedures used by EPA for both PDP (Positive Displacement Pump) and CFV (Critical Flow Venturi) are outlined below. Other procedures yielding equivalent results may be used if approved in advance by the Administrator. After the calibration curve has been obtained, verification of the entire system can be performed by injecting a known mass of gas into the system and comparing the mass indicated by the system to the true mass injected. An indicated error does not necessarily mean that the calibration is wrong, since other factors can influence the accuracy of the system, e.g. analyzer calibration. A verification procedure is found in paragraph (c) of this section.

(a) *PDP calibration.* (1) The following calibration procedure outlines the equipment, the test configuration, and the various parameters which must be measured to establish the flow rate of the constant volume sampler pump. All the parameters related to the pump are simultaneously measured with the parameters related to a flowmeter which is connected in series with the pump. The calculated flow rate (at pump inlet absolute pressure and temperature) can then be plotted versus a correlation function which is the value of a specific combination of pump parameters. The linear equation which relates the pump flow and the correlation function is then determined. In the event that a CVS has a multiple speed drive, a calibration for each range used must be performed.

(2) This calibration procedure is based on the measurement of the absolute values of the pump and flowmeter parameters that relate the flow rate at each point. Three conditions must be maintained to assure the accuracy and integrity of the calibration curve. First, the pump pressures should be measured at taps on the pump rather than at the external piping on the pump inlet and outlet. Pressure taps that are mounted at the top center and bottom center of the pump drive headplate are exposed to the actual pump cavity pressures, and therefore reflect the absolute pressure differentials. Secondly, temperature stability must be maintained during the calibration. The laminar flowmeter is sensitive to inlet temperature oscillations which cause the data points to be scattered. Gradual changes (±1° C (1.8° F)) in temperature are acceptable as long as they occur over a period of several minutes. Finally, all connections between the flowmeter and the CVS pump must be absolutely void of any leakage.

(3) During an exhaust emission test the measurement of these same pump parameters enables the user to calculate the flow rate from the calibration equation.

(4) Connect a system as shown in Figure F78-5. Although particular types of equipment are shown, other configurations that yield equivalent results may be used if approved in advance by the Administrator. For the system indicated, the following data with given accuracy are required:

CALIBRATION DATA MEASUREMENTS

Parameter	Symbol	Units	Tolerances
Barometric pressure (corrected)	P_B	kPa (in. Hg)	± 0.03 kPa (± 0.01 in. Hg).
Ambient temperature	T_A	C (F)	± 0.3 C (± 0.54 F).
Air temperature into LFE	ETI	C (F)	± 0.15 C (± 0.27 F).
Pressure depression upstream of LFE	EPI	kPa (in. H_2O)	± 0.01 kPa (± 0.05 in. H_2O).
Pressure drop across the LFE matrix	EDP	kPa (in. H_2O)	± 0.001 kPa (± 0.005 in. H_2O).
Air temperature at CVS pump inlet	PTI	C (F)	± 0.25 C (± 0.45 F).
Pressure depression at CVS pump inlet	PPI	kPa (in. Fluid)	± 0.021 kPa (± 0.046 in. Fluid).
Specific gravity of manometer fluid (1.75 oil)	Sp. Gr.		
Pressure head at CVS pump outlet	PPO	kPa (in. Fluid)	± 0.021 kPa (± 0.046 in. Fluid).
Air temperature at CVS pump outlet (optional)	PTO	C (F)	± 0.25 C (± 0.45 F).

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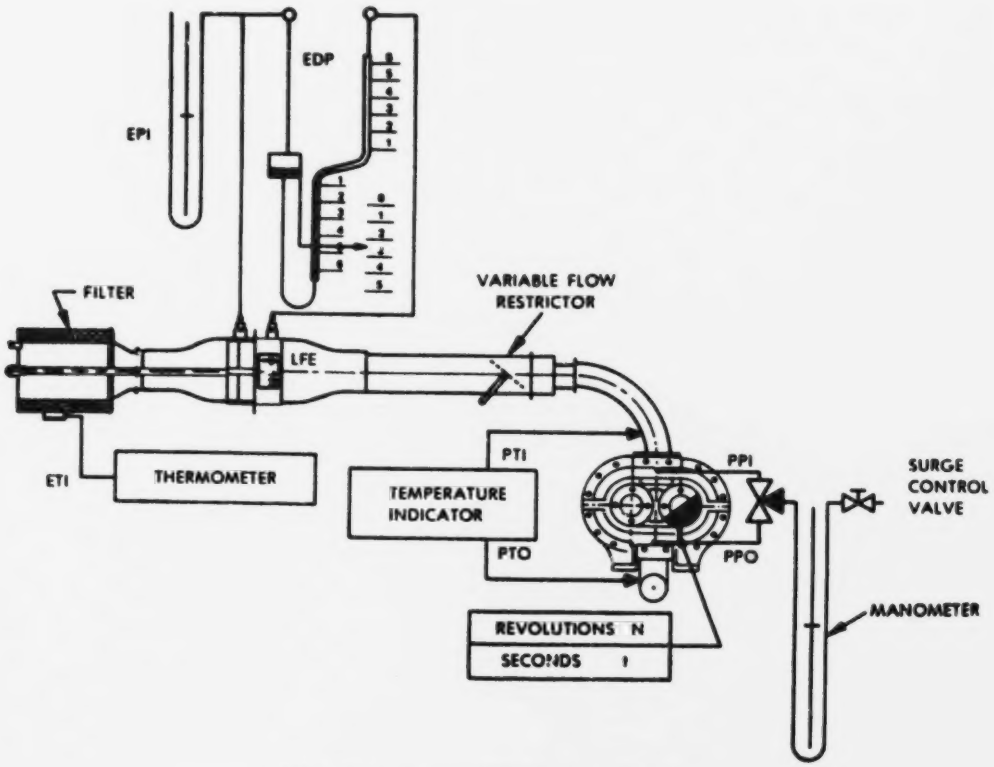
CALIBRATION DATA MEASUREMENTS—Continued

Parameter	Symbol	Units	Tolerances
Pump revolutions during test period	N	Revs	± 1 Rev.
Elapsed time for test period	t	s	± 0.05 s.



F78-5 —PDP-CVS CALIBRATION CONFIGURATION

(5) After the system has been connected as shown in Figure F78-5, set the variable restrictor in the wide open position and run the CVS pump for twenty minutes. Record the calibration data.

(6) Reset the restrictor valve to a more restricted condition in an increment of pump inlet depression (about 1.0 kPa (4" H_2O)) that will yield a minimum of six data points for the total calibration. Allow the system to stabilize for 3 minutes and repeat the data acquisition.

(7) *Data analysis:* (i) The air flow rate, Q_s, at each test point is calculated from the flowmeter data using the manufacturer's prescribed method.

(ii) The air flow rate is then converted to pump flow, V_o, per revolution at absolute pump inlet temperature and pressure.

$$V_o = (Q_s/n) \times (T_p/293.15) \times (101.325/P_p)$$

where:

V_o = Pump flow, m^3/revolution (ft^3/revolution) at T_p, P_p

Q_s = Meter air flow rate in standard cubic metres per minute, standard conditions are 20 C, 101.325 kPa (68 F, 29.92 in. Hg).

n = Pump speed in revolutions per minute.

T_p = Pump inlet temperature, K(R) PTI + 273.15 for English units, T_p PTI + 459.67

P_p = Absolute pump inlet pressure, kPa (in. Hg) P_B PPI for English units, P_p P_B PPI (SP. GR./13.57)

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where:

P_B = barometric pressure, kPa (in. Hg)

PPI = Pump inlet depression, kPa (in. fluid)

SP. GR. = Specific gravity of manometer fluid relative to water.

(iii) The correlation function at each test point is then calculated from the calibration data:

$$X_o = \frac{1}{n}\sqrt{\frac{\Delta P_p}{P_e}}$$

where:

X_o = correlation function.

P_p = The pressure differential from pump inlet to pump outlet, kPa (in. Hg) = $P_e - P_B$

P_e = Absolute pump outlet pressure, kPa (in. Hg) = P_B + PPO for English units, $P_e = P_B$ + PPO(SP. GR./13.57)

where:

PPO = Pressure head at pump outlet, kPa (in. fluid)

(iv) A linear least squares fit is performed to generate the calibration equations which have the forms:

$V_o = D_o - M(X_o)$

$n = A - B(P_p)$

D_o, M, A, and B are the slope-intercept constants describing the lines.

(8) A CVS system that has multiple speeds shall be calibrated on each speed used. The calibration curves generated for the ranges will be approximately parallel and the intercept values, D_o, will increase as the pump flow range decreases.

(9) If the calibration has been performed carefully, the calculated values from the equation will be within ±0.50 percent of the measured value of V_o. Values of M will vary from one pump to another, but values of D_o for pumps of the same make, model, and range should agree within ±3 percent of each other. Particulate influx from use will cause the pump slip to decrease as reflected by lower values for M. Calibrations should be performed at pump startup and after major maintenance to assure the stability of the pump slip rate. Analysis of mass injection data will also reflect pump slip stability.

(b) *CFV calibration.* (1) Calibration of the Critical Flow Venturi (CFV) is based upon the flow equation for a critical venturi. Gas flow is a function of inlet pressure and temperature:

$$Q_s = \frac{K_v P}{\sqrt{T}}$$

where:

Q_s = Flow

K_v = Calibration coefficient

P = Absolute pressure

T = Absolute temperature

The calibration procedure described below establishes the value of the calibration coefficient at measured values of pressure, temperature and air flow.

(2) The manufacturer's recommended procedure shall be followed for calibrating electronic portions of the CFV.

(3) Measurements necessary for flow calibration are as follows:

CALIBRATION DATA MEASUREMENTS

Parameter	Symbol	Units	Tolerances
Barometric pressure (corrected)	P_B	kPa (in. Hg)	± 0.03 kPa (± 0.01 in. Hg).
Air temperature, flowmeter	ETI	C (F)	± 0.15 C (± 0.27 F).
Pressure depression upstream of LFE	EPI	kPa (in. H_2O)	± 0.01 kPa (± 0.05 in. H_2O).
Pressure drop across LFE matrix	EDP	kPa (in. H_2O)	± 0.001 kPa (± 0.005 in. H_2O).
Air flow	Q_s	m ³/min. (ft ³/min)	± 0.5%.
CFV inlet depression	PPI	kPa (in. fluid)	± 0.02 kPa (± 0.05 in. fluid).
Temperature at venturi inlet	T_v	C (F)	± 0.25 C (± 0.45 F).
Specific gravity of manometer fluid (1.75 oil)	Sp. Gr.		

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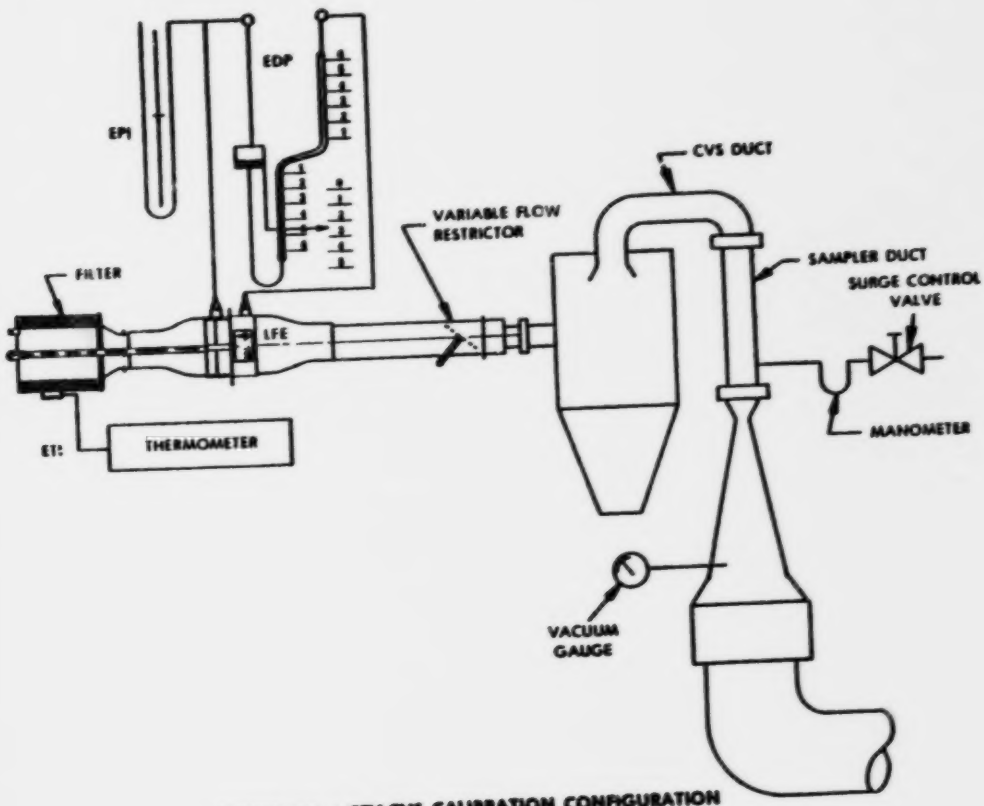

FIGURE F78-6 CFV-CVS CALIBRATION CONFIGURATION

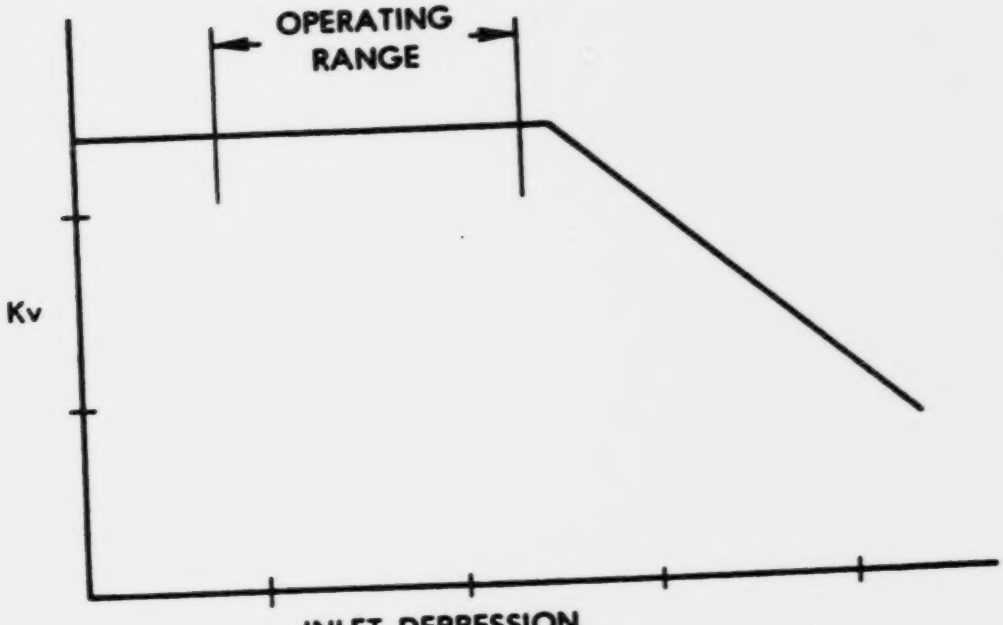

FIGURE F78-7 –SONIC FLOW CHOKING

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(4) Set up equipment as shown in Figure F78-6 and check for leaks. Any leaks between the flow measuring device and the critical flow venturi will seriously affect the accuracy of the calibration.

(5) Set the variable flow restrictor to the open position, start the blower and allow the system to stabilize. Record data from all instruments.

(6) Vary the flow restrictor and make at least 8 readings across the critical flow range of the venturi.

(7) *Data analysis.* The data recorded during the calibration are to be used in the following calculations:

(i) The air flow rate, Q_s, at each test point is calculated from the flow meter data using the manufacturer's prescribed method.

(ii) Calculate values of the calibration coefficient for each test point:

$$K_v = \frac{Q_s\sqrt{T_v}}{P_v}$$

where:

Q_s = Flow rate, standard conditions are 20° C, 101.325 kPa (68° F, 29.92 in. Hg)

T_v = Temperature at venturi inlet, K(R).

P_v = Pressure at venturi inlet, kPa (mm Hg) = $P_B - PPI$ for English units $P_v = P_B - PPI$ (SP. GR./13.57).

where:

PPI = Venturi inlet pressure depression, kPa (in. fluid).

SP. GR. = Specific gravity of manometer fluid, relative to water.

(iii) Plot K_v as a function of venturi inlet depression. For sonic flow, K_v will have a relatively constant value. As pressure decreases (vacuum increases), the venturi becomes unchoked and K_v decreases (is no longer constant). See Figure F78-7.

(iv) For a minimum of 8 points in the critical region calculate an average K_v and the standard deviation.

(v) If the standard deviation exceeds 0.3 percent of the average K_v take corrective action.

(c) *CVS System Verification.* The following "gravimetric" technique can be used to verify that the CVS and analytical instruments can accurately measure a mass of gas that has been injected into the system. (Verification can also be accomplished by constant flow metering using critical flow orifice devices.)

(1) Obtain a small cylinder that has been charged with pure propane or carbon monoxide gas (caution—carbon monoxide is poisonous).

(2) Determine a reference cylinder weight to the nearest 0.01 grams.

(3) Operate the CVS in the normal manner and release a quantity of pure propane or carbon monoxide into the system during the sampling period (approximately 5 minutes).

(4) The calculations of § 86.544 are performed in the normal way except in the case of propane. The density of propane (0.6109 kg/m^3/carbon atom (17.30 g/ft^3/carbon atom)) is used in place of the density of exhaust hydrocarbons. In the case of carbon monoxide, the density of 1.164 kg/m^3 (32.97 g/ft^3) is used.

(5) The gravimetric mass is subtracted from the CVS measured mass and then divided by the gravimetric mass to determine the percent accuracy of the system.

(6) The cause for any discrepancy greater than ±2 percent must be found and corrected.

[42 FR 1137, Jan. 5, 1977, as amended at 42 FR 56738, Oct. 28, 1977]

§ 86.520 [Reserved]

§ 86.521-78 Hydrocarbon analyzer calibration.

(a) Initial and periodic optimization of detector response. Prior to its introduction into service and at least annually thereafter the FID hydrocarbon analyzer shall be adjusted for optimum hydrocarbon response. Alternate methods yielding equivalent results may be used if approved in advance by the Administrator.

(1) Follow the manufacturer's instructions for instrument startup and basic operating adjustment using the appropriate fuel and zero grade air.

(2) Optimize on the most common operating range. Introduce into the analyzer, a propane in air mixture with a propane concentration equal to approximately 90% of the most common operating range.

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(3) Select an operating fuel flow rate that will give near maximum response and least variation in response with minor fuel flow variations.

(4) To determine the optimum air flow, use the fuel flow setting determined above and vary air flow.

(5) After the optimum flow rates have been determined, they are recorded for future reference.

(b) Initial and periodic calibration. Prior to its introduction into service and monthly thereafter the FID hydrocarbon analyzer shall be calibrated on all normally used instrument ranges. Use the same flow rate as when analyzing samples.

(1) Adjust analyzer to optimize performance.

(2) Zero the hydrocarbon analyzer with zero grade air.

(3) Calibrate on each normally used operating range with propane in air calibration gases having nominal concentrations of 50 and 100 percent of that range. Additional calibration points may be generated.

§ 86.522-78 Carbon monoxide analyzer calibration.

(a) Initial and periodic interference check. Prior to its introduction into service and annually thereafter the NDIR carbon monoxide analyzer shall be checked for response to water vapor and CO_2:

(1) Follow the manufacturer's instructions for instrument startup and operation. Adjust the analyzer to optimize performance on the most sensitive range.

(2) Zero the carbon monoxide analyzer with either zero grade air or zero grade nitrogen.

(3) Bublle a mixture of 3 percent CO_2 in N_2 through water at room temperature and record analyzer response.

(4) An analyzer response of more than 1 percent of full scale for ranges above 300 ppm full scale or of more than 3 ppm on ranges below 300 ppm full scale will require corrective action. (Use of conditioning columns is one form of corrective action which may be taken.)

(b) Initial and periodic calibration. Prior to its introduction into service and monthly thereafter the NDIR carbon monoxide analyzer shall be calibrated.

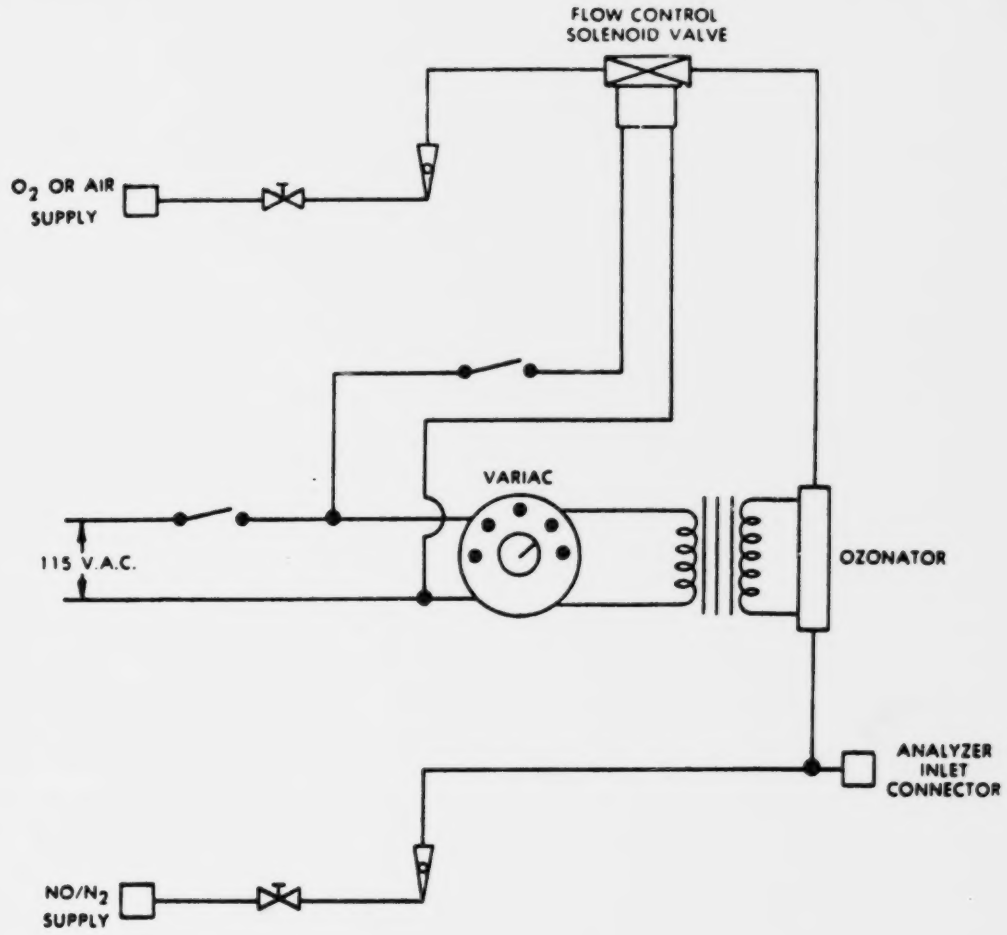
(1) Adjust the analyzer to optimize performance.

(2) Zero the carbon monoxide analyzer with either zero grade air or zero grade nitrogen.

(3) Calibrate on each normally used operating range with carbon monoxide in N_2 calibration gases having nominal concentrations of 15, 30, 45, 60, 75, and 90 percent of that range. Additional calibration points may be generated. For each range calibrated, if the deviation from a least-squares best-fit straight line is 2 percent or less of the value at each data point, concentration values may be calculated by use of a single calibration factor for that range. If the deviation exceeds 2 percent at any point, the best-fit nonlinear equation which represents the data to within 2 percent of each test point shall be used to determine concentration.

§ 86.523-78 Oxides of nitrogen analyzer calibration.

(a) Prior to its introduction into service and weekly thereafter, if oxides of nitrogen are measured, the chemiluminescent oxides of nitrogen analyzer shall be checked for NO_2 to NO converter efficiency. Figure F78-8 is a reference for the following steps:



(SEE FIG F78-3 FOR SYMBOL LEGEND)
FIGURE F78-8—NOx CONVERTER EFFICIENCY DETECTOR

(1) Follow the manufacturer's instructions for instrument startup and operation. Adjust the analyzer to optimize performance.

(2) Zero the oxides of nitrogen analyzer with zero grade air or zero grade nitrogen.

(3) Connect the outlet of the NO_x generator to the sample inlet of the oxides of nitrogen analyzer which has been set to the most common operating range.

(4) Introduce into the NO_x generator analyzer-system a NO in nitrogen (N_2) mixture with a NO concentration equal to approximately 80 percent of the most common operating range. The NO_2 content of the gas mixture shall be less than 5 percent of the NO concentration.

(5) With the oxides of nitrogen analyzer in the NO mode, record the concentration of NO indicated by the analyzer.

(6) Turn on the NO_x generator O_2 (or air) supply and adjust the O_2 (or air) flow rate so that the NO indicated by the analyzer is about 10 percent less than indicated in step 5. Record the concentration of NO in this $NO+O_2$ mixture.

(7) Switch the NO_x generator to the generation mode and adjust the generation rate so that the NO measured on the analyzer is 20 percent of that measured in step 5. There must be at least 10 percent unreacted NO at this point. Record the concentration of residual NO.

(8) Switch the oxides of nitrogen analyzer to the NO_x mode and measure total NO_x. Record this value.

(9) Switch off the NO_x generation but maintain gas flow through the system. The oxides of nitrogen analyzer will indicate the NO_x in the $NO+O_2$ mixture. Record this value.

(10) Turn off the NO_x generator O_2 (or air) supply. The analyzer will now indicate the NO_x in the original NO in N_2 mixture. This value should be no more than 5 percent above the value indicated in step 4.

(11) Calculate the efficiency of the NO_x converter by substituting the concentrations obtained into the following equation:

$$\text{Percent Eff.} = [1 + (a - b/c - d)] \times 100$$

where:

a = concentration obtained in step 8.
b = concentration obtained in step 9.
c = concentration obtained in step 6.
d = concentration obtained in step 7.

If converter efficiency is not greater than 90 percent corrective action will be required.

(b) Initial and periodic calibration. Prior to its introduction into service and monthly thereafter, if oxides of nitrogen are measured, the chemiluminescent oxides of nitrogen analyzer shall be calibrated on all normally used instrument ranges. Use the same flow rate as when analyzing samples. Proceed as follows:

(1) Adjust analyzer to optimize performance.

(2) Zero the oxides of nitrogen analyzer with zero grade air or zero grade nitrogen.

(3) Calibrate on each normally used operating range with NO in N_2 calibration gases with nominal concentrations of 50 and 100 percent of that range. Additional calibration points may be generated.

§ 86.524–78 Carbon dioxide analyzer calibration.

(a) Prior to its introduction into service and monthly thereafter the NDIR carbon dioxide analyzer shall be calibrated:

(1) Follow the manufacturer's instructions for instrument startup and operation. Adjust the analyzer to optimize performance.

(2) Zero the carbon dioxide analyzer with either zero grade air or zero grade nitrogen.

(3) Calibrate on each normally used operating range with carbon dioxide in N_2 calibration gases with nominal concentrations of 15, 30, 45, 60, 75, and 90 percent of that range. Additional calibration points may be generated. For each range calibrated, if the deviation from a least-squares best-fit straight line is 2 percent or less of the value at each data point, concentration values may be calculated by use of a single calibration factor for that range. If the deviation exceeds 2 percent at any point, the best-fit non-linear equation which represents the data to within 2 percent of each test point shall be used to determine concentration.

§ 86.525 [Reserved]

§ 86.526–78 Calibration of other equipment.

(a) Other test equipment used for testing shall be calibrated as often as required by the manufacturer or as necessary according to good practice.

§ 86.527–78 Test procedures, overview.

The procedures described in this and subsequent sections are used to determine the conformity of vehicles with the standards set forth in Subpart E.

(a) The overall test consists of prescribed sequences of fueling, parking, and operating conditions.

(b) The exhaust emission test is designed to determine hydrocarbon, carbon monoxide, and oxides of nitrogen mass emissions while simulating an average trip in an urban area. The test consists of engine startups and vehicle operation on a chassis dynamometer, through a specified driving schedule. A proportional part of the diluted exhaust emissions is collected

continuously for subsequent analysis, using a constant volume (variable dilution) sampler.

(c) [Reserved]

(d) Except in cases of component malfunction or failure, all emission control systems installed on or incorporated in a new motor vehicle shall be functioning during all procedures in this subpart. Maintenance to correct component malfunction or failure shall be authorized in accordance with Subpart E.

§ 86.528-78 Transmissions.

(a) Vehicles equipped with transfer cases, multiple sprockets, etc., shall be tested in the manufacturer's recommended configuration for street or highway use. If more than one configuration is recommended or if the recommendation is deemed unreasonable by the Administrator, the Administrator will specify the test configuration.

(b) All tests shall be conducted with automatic transmissions in "Drive" (highest gear). Automatic clutch-torque converter transmissions may be shifted as manual transmissions at the option of the manufacturer.

(c) Idle modes shall be run with automatic transmissions in "Drive" and the wheels braked, manual transmission shall be in gear with the clutch disengaged; except first idle, see §§ 86.536 and 86.537.

(d) The vehicle shall be driven with minimum throttle movement to maintain the desired speed. No simultaneous use of brake and throttle shall be permitted.

(e) Acceleration modes shall be driven smoothly. Automatic transmissions shall shift automatically through the normal sequence of gears; manual transmissions shall be shifted as recommended by the manufacturer to the ultimate purchaser (unless determined to be unreasonable by the Administrator) with the operator closing the throttle during each shift and accomplishing the shift with minimum time. If the vehicle cannot accelerate at the specified rate, the vehicle shall be operated with the throttle fully opened until the vehicle speed reaches the value prescribed for that time in the driving schedule.

(f) The deceleration modes shall be run in gear using brakes or throttle as necessary to maintain the desired speed. Manual transmission vehicles shall be downshifted using the same shift points as when upshifting or as recommended by the manufacturer in the vehicle owner's manual. All downshifts shall be made smoothly, disengaging the clutch while shifting and engaging the clutch once the lower gear has been selected. For those modes which require the vehicle to decelerate to zero, manual transmission clutches shall be disengaged when the speed drops below 15 km/h (9.3 mph) for vehicles with engine displacements equal to or greater than 280 cc (17.1 cu. in.), when the speed drops below 10 km/h (6.2 mph) for vehicles with engine displacements less than 280 cc (17.1 cu. in.), when engine roughness is evident, or when engine stalling is imminent.

(g) If downshifting during deceleration is not permitted in the vehicle owner's manual, manual transmissions will be downshifted at the beginning of or during a power mode if recommended by the manufacturer or if the engine obviously is lugging. For those modes which require these vehicles to decelerate to zero, manual transmission clutches shall be disengaged when the speed drops below 25 km/h (15.5 mph) for vehicles with engine displacement equal to or greater than 280 cc (17.1 cu. in.), when the speed drops below 20 km/h (12.4 mph) for vehicles with engine displacements less than 280 cc (17.1 cu. in.), when engine roughness is evident, or when engine stalling is imminent. While the clutch is disengaged and during these deceleration modes, the vehicle shall be shifted to the appropriate gear for starting the next mode.

(h) If shift speeds are not recommended by the manufacturer, manual transmission vehicles shall be shifted as follows:

(1) For Class I and II motorcycles:

Shift	Speed
1st to 2d gear	19 km/h (11.8 mi/h).
2d to 3d gear	33 km/h (20.5 mi/h).
3d to 4th gear	44 km/h (27.3 mi/h).

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Shift	Speed
4th to 5th gear	53 km/h (32.9 mi/h).

(2) For Class III motorcycles:

Shift	Speed
1st to 2d gear	30 km/h (18.6 mi/h).
2d to 3d gear	45 km/h (28.0 mi/h).
3d to 4th gear	60 km/h (37.3 mi/h).
4th to 5th gear	75 km/h (46.6 mi/h).

(3) Higher gears may be used at the manufacturer's option.

§ 86.529-78 Road load force and inertia weight determination.

(a) Road load as a function of speed is given by the following equation:

$$F = A + CV^2$$

The values for coefficients A and C and the test inertia are given in Figure F78-9. Velocity (V) is in km/h and force (F) is in newtons. The forces given by this equation shall be simulated to the best ability of the equipment being used.

(b) The inertia given in Figure F78-9 shall be used. Motorcycles with loaded vehicle mass outside these limits shall be tested at an equivalent inertial mass and road load force specified by the Administrator.

FIGURE F78-9

Loaded vehicle mass (kg)	Equivalent inertial mass (kg)	Force coefficients		Force at 65 km/h (nt)	70 to 60 km/h coastdown calibration times		
		A (nt)	C (nt/(km/h)^2)		Target time (sec)	Aliowable tolerance	
						Longest time (sec)	Shortest time (sec)
95-105	100	0.0	0.224	94.8	2.95	3.1	2.8
106-115	110	0.82	.0227	96.8	3.18	3.3	3.0
116-125	120	1.70	.0230	98.8	3.39	3.6	3.2
126-135	130	2.57	.0233	100.9	3.60	3.8	3.4
136-145	140	3.44	.0235	102.9	3.80	4.0	3.6
146-155	150	4.32	0.230	104.9	3.99	4.2	3.8
156-165	160	5.19	.0241	107.0	4.10	4.4	4.0
166-175	170	6.06	.0244	109.0	4.36	4.6	4.2
176-185	180	6.94	.0246	111.0	4.53	4.7	4.3
186-195	190	7.81	.0249	113.1	4.69	4.9	4.5
196-205	200	8.69	.0252	115.1	4.85	5.1	4.6
206-215	210	9.56	.0255	117.1	5.00	5.2	4.8
216-225	220	10.43	.0257	119.2	5.15	5.4	4.9
226-235	230	11.31	.0260	121.2	5.30	5.5	5.1
236-245	240	12.18	.0263	123.2	5.43	5.7	5.2
246-255	250	13.06	.0266	125.3	5.57	5.8	5.4
256-265	260	13.93	.0268	127.3	5.70	5.9	5.5
266-275	270	14.80	.0271	129.3	5.82	6.1	5.6
276-285	280	15.68	.0274	131.4	5.95	6.2	5.7
286-295	290	16.55	.0277	133.4	6.06	6.3	5.8
296-305	300	17.43	.0279	135.4	6.18	6.4	6.0
306-315	310	18.39	.0282	137.5	6.29	6.5	6.1
316-325	320	19.17	.0285	139.5	6.40	6.6	6.2
326-335	330	30.05	.0288	141.6	6.50	6.7	6.3
336-345	340	20.92	.0290	143.6	6.60	6.8	6.4
346-355	350	21.80	.0293	145.6	6.70	6.9	6.5
356-365	360	22.67	.0296	147.7	6.80	7.0	6.6
366-375	370	23.54	.0299	149.7	6.89	7.1	6.7
376-385	380	24.42	.0301	151.7	6.98	7.2	6.8
386-395	390	25.29	.0304	153.8	7.07	7.3	6.9
396-405	400	26.17	.0307	155.8	7.16	7.4	6.9
406-415	410	27.04	.0310	157.8	7.24	7.5	7.0
416-425	420	27.91	.0312	159.9	7.33	7.6	7.1
426-435	430	28.79	.0315	161.9	7.41	7.6	7.2
436-445	440	29.66	.0317	163.7	7.49	7.7	7.3
446-455	450	30.54	.0318	164.9	7.61	7.8	7.4
456-465	460	31.41	.0319	166.0	7.73	8.0	7.5
466-475	470	32.28	.0319	167.1	7.84	8.1	7.6

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FIGURE F78-9—Continued

Loaded vehicle mass (kg)	Equivalent inertial mass (kg)	Force coefficients		Force at 65 km/h (nt)	70 to 60 km/h coastdown calibration times		
		A (nt)	C (nt/(km/h)^2)		Target time (sec)	Allowable tolerance	
						Longest time (sec)	Shortest time (sec)
476-485	480	33.16	.0320	168.3	7.95	8.2	7.7
486-495	490	43.03	.32	169.4	8.06	8.3	7.8
496-505	500	34.90	.0321	170.5	8.17	8.4	7.9
506-515	510	35.78	.0322	171.7	8.28	8.5	8.0
516-525	520	36.65	.0322	172.8	8.39	8.6	8.2
526-535	530	37.53	.0323	173.9	8.49	8.7	8.3
536-545	540	38.40	.0323	175.1	8.60	8.8	8.4
546-555	550	39.27	.0324	176.2	8.70	9.0	8.5
556-565	560	40.15	.0325	177.3	8.80	9.1	8.6
566-575	570	41.02	.0325	178.5	8.90	9.2	8.7
576-585	580	41.90	.0326	179.6	9.00	9.3	8.8
586-595	590	42.77	.0327	180.8	9.10	9.4	8.9
596-605	600	43.64	.0327	181.9	9.19	9.5	8.9
606-615	610	44.52	.0328	183.0	9.29	9.5	9.0
616-625	620	45.39	.0328	184.2	9.38	9.6	9.1
626-635	630	46.27	.0329	185.3	9.47	9.7	9.2
636-645	640	47.14	.0330	186.4	9.56	9.8	9.3
646-655	650	48.01	.0330	187.6	9.65	9.9	9.4
565-665	660	48.89	.0331	188.7	9.74	10.0	9.5
666-675	670	49.76	.0332	189.8	9.83	10.1	9.6
676-685	680	50.64	.0332	191.0	9.92	10.2	9.7
686-695	690	51.91	.0333	192.1	10.01	10.3	9.8
696-705	700	52.38	.0333	193.2	10.09	10.4	9.8
706-715	710	53.26	.0334	194.4	10.17	10.4	9.9
716-725	720	54.13	.0335	195.5	10.26	10.5	10.0
726-735	730	55.01	.0335	196.6	10.34	10.6	10.1
736-745	740	55.88	.0336	197.8	10.42	10.7	10.2
746-755	750	56.75	.0336	198.9	10.50	10.8	10.2
756-760	760	57.63	.0337	200.1	10.58	10.9	10.3

(c) The dynamometer shall be adjusted to reproduce the specified road load as determined by the most recent calibration. Alternatively, the actual vehicle road load can be measured and duplicated:

(1) Make at least 5 replicate coastdowns in each direction from 70 to 60 km/h on a smooth, level, track under balanced wind conditions. The driver must have a mass of 80±10 kg and be in the normal driving position. Record the coastdown time.

(2) Average the coastdown times. Adjust the dynamometer load so that the coastdown time is duplicated with the vehicle and driver on the dynamom-eter.

(3) Alternate procedures may be used if approved in advance by the Administrator.

§ 86.530-78 Test sequence, general requirements.

(a) Ambient temperature levels encountered by the test vehicle throughout the test sequence shall not be less than 20° C (68° F) nor more than 30° C (86° F). The vehicle shall be approximately level during the emission test to prevent abnormal fuel distribution.

§ 86.531-78 Vehicle preparation.

(a) The manufacturer shall provide additional fittings and adapters, as required by the Administrator * * *, such as * * * to accommodate a fuel drain at the lowest point possible in the tank(s) as installed on the vehicle and to provide for exhaust sample collection.

§ 86.532-78 Vehicle preconditioning.

(a) The vehicle shall be moved to the test area and the following operations performed:

(1) The fuel tank(s) shall be drained through the provided fuel tank(s) drain(s) and charged with the specified test fuel, § 86.513, to half the tank(s) capacity.

(2) The vehicle shall be placed, either by being driven or pushed, on a

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dynamometer and operated through one Urban Dynamometer Driving Schedule test procedure (see § 86.515 and Appendix I). The vehicle need not be cold, and may be used to set dynamometer horsepower.

(b) Within five (5) minutes of completion of preconditioning, the vehicle shall be removed from the dynamometer and may be driven or pushed to the soak area to be parked. The vehicle shall be stored for not less than the following times prior to the cold start exhaust test.

Hours	
Class I	6
Class II	8
Class III	12

In no case shall the vehicle be stored for more than 36 hours prior to the cold start exhaust test.

§§ 86.533—86.534 [Reserved]

§ 86.535–78 Dynamometer procedure.

(a) The dynamometer run consists of two tests, a "cold" start test and a "hot" start test following the "cold" start by 10 minutes. Engine startup (with all accessories turned off), operation over the driving schedule, and engine shutdown make a complete cold start test. Engine startup and operation over the first 505 seconds of the driving schedule complete the hot start test. The exhaust emissions are diluted with ambient air and a continuously proportional sample is collected for analysis during each phase. The composite samples collected in bags are analyzed for hydrocarbons, carbon monoxide, carbon dioxide, and, optionally, for oxides of nitrogen. A parallel sample of the dilution air is similarly analyzed for hydrocarbon, carbon monoxide, carbon dioxide, and, optionally, for oxides of nitrogen.

(b) [Reserved]

(c) The vehicle speed, as measured from the dynamometer roll, shall be used. A speed vs. time recording, as evidence of dynamometer test validity, shall be supplied on request of the Administrator.

(d) Practice runs over the prescribed driving schedule may be performed at test points, provided an emission sample is not taken, for the purpose of finding the minimum throttle action to maintain the proper speed-time relationship, or to permit sampling system adjustments.

(e) The drive wheel tires must be inflated to the manufacturer's recommended pressure, ±15kPa (±2.2 psi). The drive wheel tire pressure shall be reported with the test results.

(f) If the dynamometer has not been operated during the two hour period immediately preceding the test, it shall be warmed up for 15 minutes by operating at 50 km/h (31.1 mph) using a non-test vehicle, or as recommended by the dynamometer manufacturer.

(g) If the dynamometer horsepower must be adjusted manually, it shall be set within one hour prior to the exhaust emissions test phase. The test vehicle shall not be used to make this adjustment. Dynamometers using automatic control of preselectable power settings may be set anytime prior to the beginning of the emissions test.

(h) The driving distance, as measured by counting the number of dynamometer roll revolutions, shall be determined for the transient cold start, stabilized cold start, and transient hot start phases of the test.

[42 FR 1137, Jan. 5, 1977, as amended at 42 FR 56738, Oct. 28, 1977]

§ 86.536–78 Engine starting and restarting.

(a)(1) The engine shall be started according to the manufacturer's recommended starting procedures. The initial 20 second idle period shall begin when the engine starts.

(2) *Choke operation.* (i) Vehicles equipped with automatic chokes shall be operated according to the instructions in the manufacturer's operating instructions or owner's manual including choke setting and "kick-down" from cold fast idle. The transmission shall be placed in gear 15 seconds after the engine is started. If necessary, braking may be employed to keep the drive wheels from turning.

(ii) Vehicles equipped with manual chokes shall be operated according to

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the manufacturer's operating instructions or owner's manual. Where times are provided in the instructions, the Administrator may specify the specific point for operation, within 15 seconds of the recommended time.

(3) The operator may use the choke, throttle etc. where necessary to keep the engine running.

(4) If the manufacturer's operating instructions or owner's manual do not specify a warm engine starting procedure, the engine (automatic and manual choke engines) shall be started by opening the throttle about half way and cranking the engine until it starts.

(b) [Reserved]

(c) If, during the cold start, the vehicle does not start after 10 seconds of cranking, or ten cycles of the manual starting mechanism, cranking shall cease and the reason for failure to start determined. The revolution counter on the constant volume sampler shall be turned off and the sample solenoid valves placed in the "standby" position during this diagnostic period. In addition, either the CVS blower shall be turned off or the exhaust tube disconnected from the tailpipe during the diagnostic period.

(1) If failure to start is an operational error, the vehicle shall be rescheduled for testing from a cold start. If failure to start is caused by vehicle malfunction, corrective action (following the unscheduled maintenance provisions) of less than 30 minutes duration may be taken and the test continued. The sampling system shall be reactivated at the same time cranking is started. When the engine starts, the driving schedule timing sequence shall begin. If failure to start is caused by vehicle malfunction and the vehicle cannot be started, the test shall be voided, the vehicle removed from the dynamometer, corrective action taken (following the unscheduled maintenance provisions), and the vehicle rescheduled for test. The reason for the malfunction (if determined) and the corrective action taken shall be reported.

(2) If the vehicle does not start during the hot start after ten seconds of cranking, or ten cycles of the manual starting mechanism, cranking shall cease, the test shall be voided, the vehicle removed from the dynamometer, corrective action taken in accordance with § 86.428 or § 86.429, and the vehicle rescheduled for test. The reason for the malfunction (if determined) and the corrective action taken shall be reported.

(d) If the engine "false starts", the operator shall repeat the recommended starting procedure (such as resetting the choke, etc.)

(e) *Stalling.* (1) If the engine stalls during an idle period, the engine shall be restarted immediately and the test continued. If the engine cannot be started soon enough to allow the vehicle to follow the next acceleration as prescribed, the driving schedule indicator shall be stopped. When the vehicle restarts, the driving schedule indicator shall be reactivated.

(2) If the engine stalls during some operating mode other than idle, the driving schedule indicator shall be stopped, the vehicle shall then be restarted and accelerated to the speed required at that point in the driving schedule and the test continued. During acceleration to this point, shifting shall be performed in accordance with § 86.528.

(3) If the vehicle will not restart within one minute, the test shall be voided, the vehicle removed from the dynamometer, corrective action taken, and the vehicle rescheduled for test. The reason for the malfunction (if determined) and the corrective action taken shall be reported.

§ 86.537-78 Dynamometer test runs.

(a) The vehicle shall be allowed to stand with the engine turned off (see § 86.532 for required time). The vehicle shall be stored prior to the emission test in such a manner that precipitation (e.g., rain or dew) does not occur on the vehicle. The complete dynamom-eter test consists of a cold start drive of 12.0 km (7.5 miles), (10.9 km (6.8 miles) for Class I motorcycles) and simulates a hot start drive of 12.0 km (7.5 miles), (10.9 km (6.8 miles) for Class I motorcycles). The vehicle is allowed to stand on the dynamometer during the 10 minute period between the cold and hot start tests. The cold

start is divided into two periods. The first period, representing the cold start "transient" phase, terminates at the end of the deceleration which is scheduled to occur at 505 seconds of the driving schedule. The second period, representing the "stabilized" phase, consists of the remainder of the driving schedule including engine shutdown. The hot start test similarly consists of two periods. The period, representing the hot start "transient" phase, terminates at the same point in the driving schedule at the first period of the cold start test. The second period of the hot start test, "stabilized" phase, is assumed to be identical to the second period of the cold start test. Therefore, the hot start test terminates after the first period (505 seconds) is run.

(b) The following steps shall be taken for each test:

(1) Place drive wheel of vehicle on dynamometer without starting engine.

(2) Activate vehicle cooling fan system.

(3) With the sample selector valves in the "standby" position, connect sample collection bags to the dilute exhaust and dilution air sample collection systems.

(4) Start the Constant Volume Sampler (if not already on), the sample pumps, and the temperature recorder. (The heat exchanger of the constant volume sampler, if used, should be preheated to operating temperature before the test begins.)

(5) Adjust the sample flow rates to the desired flow rate (minimum of 80 cc/s (10.2 ft^3/hr) for PDP-CVS) and set the gas flow measuring devices to zero.

(6) Evacuate sample collection bags.

NOTE: CF-CVS sample flowrate is fixed by the venturi design.

(7) Attach the flexible exhaust tube to the vehicle tailpipe(s).

(8) Start the gas flow measuring device, position the sample selector valves to direct the sample flow into the "transient" exhaust sample bag and the "transient" dilution air sample bag and start cranking the engine.

(9) Fifteen seconds after the engine starts, place the transmission in gear.

(10) Twenty seconds after the engine starts, begin the initial vehicle acceleration of the driving schedule.

(11) Operate the vehicle according to the dynamometer driving schedule (§ 86.515).

(12) At the end of the deceleration which is scheduled to occur at 505 seconds, simultaneously switch the sample flows from the "transient" bags to the "stabilized" bags, switch off gas flow measuring device No. 1 and start gas flow measuring device No. 2. Before the acceleration, which begins at 510 seconds, record the roll revolutions. As soon as possible, transfer the "transient" exhaust and dilution samples to the analytical system and process the samples according to § 86.540 obtaining a stabilized reading of the exhaust sample on all analyzers within 20 minutes of the end of the cold transient phase of the test.

(13) Turn engine off 2 seconds after the end of the last deceleration (at 1,369 seconds).

(14) Five seconds after the engine stops running, simultaneously turn off gas flow measuring device No. 2 and position the sample selector valves to the "standby" position. Record the measured roll revolutions. As soon as possible, transfer the "stabilized" exhaust and dilution air samples to the analytical system and process the samples according to § 86.540 obtaining a stabilized reading of the exhaust sample on all analyzers within 20 minutes of the end of the cold transient phase of the test.

(15) Immediately after the end of the sample period turn off the vehicle cooling fan system.

(16) Turn off the CVS or disconnect the exhaust tube from the tailpipe of the vehicle.

(17) Repeat the steps in paragraphs (b)(2) through (10) of this section for the hot start test, except only one evacuated sample bag is required for sampling exhaust gas and one for dilution air. The step in paragraph (b)(7) of this section shall begin between 9 and 11 minutes after the end of the sample period for the cold start test.

(18) At the end of the deceleration which is scheduled to occur at 505 seconds, simultaneously turn off gas flow measuring device No. 1 and position

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the sample selector valve to the "standby" position. (Engine shutdown is not part of the hot start test sample period.) Record the measured roll revolutions.

(19) As soon as possible, transfer the hot start "transient" exhaust and dilution air samples to the analytical system and process the samples according to § 86.540 obtaining a stabilized reading of the exhaust sample on all analyzers within 20 minutes of the end of the hot transient phase of the test.

(20) Disconnect the exhaust tube from the vehicle tailpipe(s) and remove vehicle from dynamometer.

(21) The constant volume sampler may be turned off, if desired.

(22) Continuous monitoring of exhaust emissions will not normally be allowed. Specific written approval must be obtained from the Administrator for continuous monitoring of exhaust emissions.

[42 FR 1137, Jan. 5, 1977, as amended at 42 FR 56738, Oct. 28, 1977]

§§ 86.538—86.539 [Reserved]

§ 86.540-78 Exhaust sample analysis.

The following sequence of operations shall be performed in conjunction with each series of measurements:

(a) Check flowrates and pressures. Adjust if required.

(b) Zero the analyzers and obtain a stable zero reading. Recheck after tests.

(c) Introduce span gases and set instrument gains. In order to avoid corrections, span and calibrate at the same flow rates used to analyze the test sample. Span gases should have concentrations equal to 75 to 100 percent of full scale. If gain has shifted significantly on the analyzers, check the calibrations. Show actual concentrations on chart.

(d) Check zeros: repeat the procedure in paragraphs (a) through (c) of this section if required.

(e) Check flowrates and pressures.

(f) Measure HC, CO, CO_2, and, optionally, NO_x concentrations of samples.

(g) [Reserved]

(h) Check zero and span points. If difference is greater than 2 percent of full scale, repeat the procedure in paragraphs (a) through (g) of this section.

[42 FR 1137, Jan. 5, 1977 and 42 FR 56739, Oct. 28, 1977]

§ 86.541 [Reserved]

§ 86.542-78 Records required.

The following information shall be recorded with respect to each test:

(a) Test number.

(b) System or device tested (brief description).

(c) Date and time of day for each part of the test schedule.

(d) Instrument operator.

(e) Driver or operator.

(f) *Vehicle:* Make, Vehicle identification number, Model year, Transmission type, Odometer reading at initiation of preconditioning, Engine displacement, Engine family, Emission control system, Recommended Idle RPM, Nominal fuel tank capacity, Inertial loading, Actual curb mass recorded at 0 kilometers, and Drive wheel tire pressure.

(g) *Dynamometer serial number:* As an alternative to recording the dynamometer serial number, a reference to a vehicle test cell number may be used, with the advance approval of the Administrator, provided the test cell records show the pertinent information.

(h) All pertinent instrument information such as tuning—gain—serial number—detector number—range. As an alternative, a reference to a vehicle test cell number may be used, with the advance approval of the Administrator, provided test cell calibration records show the pertinent instrument information.

(i) *Recorder charts:* Identify zero, span, exhaust gas, and dilution air sample traces.

(j) Test cell barometric pressure, ambient temperature and humidity.

NOTE: A central laboratory barometer may be used; provided that individual test cell barometric pressures are shown to be within ± 0.1 percent of the barometric pressure at the central barometer location.

(k) [Reserved]

(l) Pressure of the mixture of exhaust and dilution air entering the

CVS metering device, the pressure increase across the device, and the temperature at the inlet. The temperature may be recorded continuously or digitally to determine temperature variations.

(m) The number of revolutions of the positive displacement pump accumulated during each test phase while exhaust samples are being collected. The number of standard cubic metres metered by a critical flow venturi during each test phase would be the equivalent record for a CFV-CVS.

(n) The humidity of the dilution air.

NOTE: If conditioning columns are not used (see § 86.522 and § 86.544) this measurement can be deleted. If the conditioning columns are used and the dilution air is taken from the test cell, the ambient humidity can be used for this measurement.

(o) The driving distance for each of the three phases of test, calculated from the measured roll or shaft revolutions.

[42 FR 1137, Jan 5, 1977, as amended at 42 FR 56739, Oct. 28, 1977]

§ 86.543 [Reserved]

§ 86.544-78 Calculations; exhaust emissions.

The final reported test results, with oxides of nitrogen being optional, shall be computed by use of the following formulae: (The results of all emission tests shall be rounded, using the "Rounding-Off Method" specified in ASTM E 29-67, to the number of places to the right of the decimal point indicated by expressing the applicable standard to three significant figures.)

(a)

$$Ywm = 0.43[(Yct + Ys)/(Dct + Ds)] + 0.57[(Yht + Ys)/(Dht + Ds)].$$

where:

Ywm = Weighted mass emissions of CO_2 or of each pollutant, i.e., HC, CO, or NOx, in grams per vehicle kilometre.

Yct = Mass emissions as calculated from the "transient" phase of the cold start test, in grams per test phase.

Yht = Mass emissions as calculated from the "transient" phase of the hot start test, in grams per test phase.

Ys = Mass emissions as calculated from the "stabilized" phase of the cold start test, in grams per test phase.

Dct = The measured driving distance from the "transient" phase of the cold start test, in kilometres.

Dht = The measured driving distance from the "transient" phase of the hot start test, in kilometres.

Ds = The measured driving distance from the "stabilized" phase of the cold start test, in kilometres.

(b) The mass of each pollutant for each phase of both the cold start test and the hot start test is determined from the following:

(1) Hydrocarbon mass:

HCmass = Vmix X DensityHC X (HCconc/1,000,000).

(2) Oxides of nitrogen mass:

NOxmass = Vmix X DensityNO2 X (NOxconc X Kh/1,000,000).

(3) Carbon monoxide mass:

COmass = Vmix X DensityCO X (COconc/1,000,000).

(4) Carbon dioxide mass:

CO2mass = Vmix X DensityCO2 X (CO2 conc/100).

(c) Meaning of symbols:

HCmass = Hydrocarbon emissions, in grams per test phase.

DensityHC = Density of hydrocarbon in the exhaust gas, 0.5768 kg/m³/carbon atom (16.33 g/ft³/carbon atom), assuming an average carbon to hydrogen ratio of 1:1.85, at 20° C (68° F) and 101.325 kPa (760 mm Hg) pressure.

HCconc = Hydrocarbon concentration of the dilute exhaust sample corrected for background, in ppm carbon equivalent, i.e., equivalent propane X3.

HCconc = HCe-HCd (1-1/DF).

Where:

HCe = Hydrocarbon concentrations of the dilute exhaust sample as measured, in ppm carbon equivalent. (propane ppm x 3.)

HCd = Hydrocarbon concentration of the dilution air as measured, in ppm carbon equivalent. (Propane ppm x 3.)

NOxmass = Oxides of nitrogen emissions, in grams per test phase.

Density NO2 = Density of oxides of nitrogen in the exhaust gas, assuming they are in the form of nitrogen dioxide, 1,913 kg/m³ (54.16 g/ft³), at 20° C (68° F) and 101.325 kPa (760 mm Hg) pressure.

NOxconc = Oxides of nitrogen concentration of the dilute exhaust sample corrected for background, in ppm.

NOxconc = NOxe-NOxd (1-1/DF).

Where:

NOxe = Oxides of nitrogen concentration of the dilute exhaust sample as measured, in ppm.
NOxd = Oxides of nitrogen concentration of the dilution air as measured, in ppm.
COmass = Carbon monoxide emissions, in grams per test phase.
Density CO = Density of carbon monoxide, 1.164 kg/m³ (32.97 g/ft³), at 20° C (68° F) and 101.325 kPa (760 mm Hg) pressure.
COconc = Carbon monoxide concentration of the dilute exhaust sample corrected for background, water vapor, and CO2 extraction, ppm.

$$COconc = COe - COd\ (1 - 1/DF).$$

Where:

COe = Carbon monoxide concentration of the dilute exhaust sample volume corrected for water vapor and carbon dioxide extraction, in ppm. The calculation assumes the carbon to hydrogen ratio of the fuel is 1:1.85.

$$COe = (1 - 0.01925CO2e - 0.000323R)\ COem.$$

Where:

COem = Carbon monoxide concentration of the dilute exhaust sample as measured, in ppm.
CO2e = Carbon dioxide concentration of the dilute exhaust sample, in mole percent.
R = Relative humidity of the dilution air, in percent (see § 86.542.78(n)).
COd = Carbon monoxide concentration of the dilution air corrected for water vapor extraction, in ppm.

$$COd = (1 - 0.000323R)\ COdm.$$

Where:

COdm = Carbon monoxide concentration of the dilution air sample as measured, in ppm.

NOTE: If a CO instrument, which meets the criteria specified in § 86.511 is used and the conditioning column has been deleted, COem can be substituted directly for COd.

CO2mass = Carbon dioxide emissions, in grams per test phase.
Density CO2 = Density of carbon dioxide, 1.830 kg/m³ (51.81 g/ft³), at 20° C (68° F) and 101.325 kPa (760 mmHg) pressure.
CO2conc = carbon dioxide concentration of the dilute exhaust sample corected for background, in percent.

$$CO2conc = CO2e - CO2d\ (1 - 1/DF)\ 10^{-4}.$$

Where:

CO2d = Carbon dioxide concentration of the dilution air as measured, in ppm.

$$DF = 13.4/[CO_{2_e} + (HC_e + CO_e)10^{-4}].$$

Vmix = Total dilute exhaust volume in cubic metres per test phase corrected to standard conditions (293.15° K (528° R) and 101.325 kPa (760 mm Hg)).

$$Vmix = VoXN\ [(Pb - Pi)\ (293.15°\ K)]/[(101.325\ kPa)\ (Tp)].$$

Where:

Vo = Volume of gas pumped by the positive displacement pump, in cubic metres per revolution. This volume is dependent on the pressure differential across the positive displacement pump. (See calibration techniques in 86.519-78.)
N = Number of revolutions of the positive displacement pump during the test phase while samples are being collected.
Pb = Barometric pressure in kPa.
Pi = Pressure depression below atmospheric measured at the inlet to the positive displacement pump.
Tp = Average temperature of dulute exhaust entering positive displacement pump during test while samples are being collected, in degrees Kelvin.
Kh = Humidity correction factor.

$$Kh = 1/[1 - 1 - 0.0329\ (H - 10.71)].$$

Where:

H = Absolute humidity in grams of water per kilogram of dry air.

$$H = [(6.211)\ Ra\ X\ Pd]/[Pb - (Pd\ X\ Ra/100)_{\iota}].$$

Ra = Relative humidity of the ambient air, in percent.
Pd = Saturated vapor pressure, in kPa at the ambient dry bulb temperature.

(d) Sample calculation of mass emission values for vehicles with engine displacements equal to or greater than 170 cc (10.4 cu. in.):

(1) For the "transient" phase of the cold start test, assume Vo = 0.0077934 m³ per revolution; N = 12,115; R = 20.5 percent; Ra = 20.5 percent; Pb = 99.05 kPa; Pd = 3.382 kPa; Pi = 9.851 kPa; Tp = 309.8 K; HCe 249.75 ppm carbon equivalent; NOxe = 38.30 ppm; COem = 311.23 ppm; CO2e = 0.415 percent; HCd = 4.90 ppm; NOxd = 0.30 ppm; COdm = 8.13 ppm; CO2d = 370 ppm; Dct = 5.650 km.

Then:

Vmix = [(0.0077934) (12,115) (99.05-9.851) (293.15)]/[(101.325) (309.8)]
Vmix = 78.651 m³ per test phase.
H = [(6.211) (20.5) (3.382)]/[(99.05)—(3.382) (20.5/100)]
H = 4.378 grams H_2O per kg dry air.
Kh = 1/[1-0.0329(4.378-10.71)]
Kh = 0.8276
COe = [1-0.01925(0.415)-0.000323 (20.5)] 311.23
COe = 306.38 ppm.
COd = [1-0.000323 (20.5)] 8.13

COd = 8.08 ppm.
DF = 13.4/[0.415 + (249.75 + 306.68) 10^{-5}]
DF = 28.472
HCconc = 249.75 − 4.90(1-1/28.472)
HCconc = 245.02 ppm.
HCmass = (78.651) (576.7) (245.02) 10^{-6}
HCmass = 11.114 grams per test phase
NOxconc = 38.30 − 0.30 (1-1/28.472)
NOxconc = 38.01 ppm.
NOxmass = (78.651) (1913) (38.01) (0.8276) 10^{-6}
NOxmass = 4.733 grams per test phase.
COconc = 306.68 − 8.08 (1-1/28.472)
COconc = 298.88 ppm.
COmass = (78.651) (1164) (298.88) 10^{-6}
COmass = 27.362 grams per test phase.
CO2conc = 0.415 − 370 (1-1/28.472) 10^{-4}
CO2conc = 0.3793 percent.
CO2mass = (78.651) (1843) (0.3793) 10^{-2}
CO2mass = 549.81 grams per test phase.

(2) For the "stabilized" portion of the cold start test, assume that similar calculations resulted in HCmass = 7.184 grams per test phase; NOxmass = 2.154 grams per test phase; COmass = 64.541 grams per test phase; and CO2mass = 529.52 grams per test phase. Ds = 6.070 kilometres.

(3) For the "transient" portion of the hot start test, assume that similar calculations resulted in HCmass = 6.122 grams per test phase; NOxmass = 7.056 grams per test phase; COmass = 34.964 grams per test phase; and CO2mass = 480.93 grams per test phase. Dht = 5.660 kilometres.

(4) For a 1978 motorcycle with an engine displacement equal to or greater than 170 cc (10.4 cu. in.):

HCwm = 0.43[(11.114 + 7.184)/(5.650 + 6.070)] + 0.57[(6.122 + 7.184)/(5.660 + 6.070)]
HCwm = 1.318 grams per vehicle kilometer.
NOxwm = 0.43[(4.733 + 2.154) / (5650 + 6.070)] + 0.57 [(7.056 + 2.154) / (5.660 + 6.070)]
NOxwm = 0.700 grams per vehicle kilometre.
COwm = 0.43[(27.362 + 64.541) / (5.650 + 6.070)] + 0.57 [(34.964 + 64.541) / (5.660 + 6.070)]
COwm = 8.207 grams per vehicle kilometre.
CO2wm = 0.43[(549.81 + 529.52) / (5.650 + 6.070)] + 0.57 [(480.93 + 529.52) / (5.660 + 6.070)]
CO2wm = 88.701 grams per vehicle kilometre.

[42 FR 1137, Jan 5, 1977, as amended at 42 FR 56739, Oct. 28, 1977; 43 FR 52923, Nov. 14, 1978]

Subpart G—Selective Enforcement Auditing of New Gasoline-Fueled and Diesel Light-Duty Vehicles and New Gasoline-Fueled and Diesel Light-Duty Trucks

SOURCE: 41 FR 31483, July 28, 1976, unless otherwise noted.

§ 86.601 Applicability.

For 1977 model year vehicles produced before January 1, 1977, the provisions of this subpart with the exception of §§ 86.612 and 86.613 and paragraph (b)(2) of § 86.608 are applicable to new gasoline-fueled light-duty vehicles, new diesel light-duty vehicles, new gasoline-fueled light-duty trucks, and new diesel light-duty trucks. For 1977 vehicles produced beginning January 1, 1977 and later model year vehicles, the provisions of this subpart with the exception of paragraph (b)(2) of § 86.608 are applicable. For 1981 and later model year vehicles, all provisions of this subpart are applicable.

[44 FR 2975, Jan. 12, 1979]

§ 86.602 Definitions.

(a) As used in this subpart, all terms not defined herein or in Subpart A or B of this part shall have the meaning given them in the Act:

(1) "Acceptable Quality Level" (AQL) means the maximum percentage of failing vehicles that, for purposes of sampling inspection, can be considered satisfactory as a process average.

(2) "Batch" means the collection of vehicles of the same configuration, as designated by the Administrator in a test order, from which a batch sample is to be drawn and inspected to determine conformance with the acceptability criteria.

(3) "Batch Size" means the number, as designated by the Administrator in the test order, of vehicles of the same configuration in a batch.

(4) "Batch Sample" means the collection of vehicles of the same configuration which are drawn from a batch from which test samples are drawn.

(5) "Batch Sample Size" means the number of vehicles of the same configuration in a batch sample.

(6) "Test Sample" means the collection of vehicles of the same configuration which are drawn from the batch sample and which will receive exhaust emission tests.

(7) "Test Sample Size" means the number of vehicles of the same configuration in a test sample.

(8) "Inspection Criteria" means the acceptance and rejection numbers associated with a particular sampling plan.

(9) "Acceptance of a Batch" means that the number of noncomplying vehicles in the batch sample is less than or equal to the acceptance number as determined by the appropriate sampling plan.

(10) "Rejection of a Batch" means that the number of noncomplying vehicles in the batch sample is greater than or equal to the rejection number as determined by the appropriate sampling plan.

(11) "Acceptance of a Batch Sequence" means that the number of rejected batches in the sequence is less than or equal to the sequence acceptance number as determined by the appropriate sampling plan.

(12) "Rejection of a Batch Sequence" means that the number of rejected batches is equal to or greater than the sequence rejection number as determined by the appropriate sampling plan.

(13) "Vehicle" means any new production light duty motor vehicle or any new production light duty truck as defined in Subpart A of this part.

(14) "Test Vehicle" means a vehicle in a test sample.

(15) "Low-Mileage Emissions Target" for a particular pollutant is the value in grams per mile resulting from the division of the emission standard by the applicable engine family deterioration factor derived from the certification process performed under Subparts A or B of this part for the applicable model year.

(16) "In the Hands of the Manufacturer" means that vehicles are still in the possession of the manufacturer and have not had their bills of lading transferred to another person for the purpose of transporting.

[41 FR 31483, July 28, 1976, as amended at 42 FR 31160, June 20, 1977]

§ 86.603 Test orders.

(a) The Administrator will require any testing under this subpart by means of a test order addressed to the manufacturer.

(b) The test order will be signed by the Assistant Administrator for Enforcement or his designee. The test order will be delivered by an EPA Enforcement Officer or sent by registered mail, return receipt requested, to the authorized company representative of the manufacturer who signs the Application for Certification submitted by the manufacturer pursuant to the requirements of the applicable sections of Subpart A of this part.

(c) The test order will specify the vehicle configuration selected for testing, the manufacturer's plant or storage facility from which the vehicles must be selected, the time and location at which vehicles must be selected, the batch size, the manner in which vehicles must be selected from the batch, and whether test vehicles are to be weighed. The test order may include an alternative configuration selected for testing in the event that vehicles of the first specified configuration are not available for testing because such vehicles are not being manufactured at the specified plant, not being manufactured during the specified time or not being stored at the specified plant or storage facility. In addition, the test order may include other directions or information essential to the administration of the required testing.

(d) A manufacturer may indicate preferred assembly plants for the various engine families produced by the manufacturer for selection of vehicles in response to a test order. This shall be accomplished by submitting a list of engine families and the corresponding assembly plants from which the manufacturer desires to have vehicles selected to the Administrator. In order that a manufacturer's preferred location for issuance of a test order for a configuration of a particular engine family be considered, the list must be submitted prior to issuance of the test order. Notwithstanding the fact that a manufacturer has submitted the above list, the Administrator may, upon

making the determination that evidence exists indicating noncompliance at other than the manufacturer's preferred plant, order testing at such other plant where vehicles of the configuration specified in the test order are assembled.

(e) A manufacturer shall upon receipt of a test order proceed in accordance with the provisions of this subpart.

(f) The Administrator will not issue to a manufacturer during a given model year more test orders than an annual limit determined by dividing the projected sales for that year, as made by the manufacturer in his Application for Certification, by 300,000 and rounding to the nearest whole number unless the projected sales are less than 150,000 in which case the annual limit is one: Except, That the Administrator may issue one additional test order beyond the annual limit for each configuration for which the batch sequence is rejected in accordance with § 86.611 and when the annual limit, increased by such additional test orders, has been met, additional test orders may be issued for configurations for which evidence exists indicating noncompliance.

(g) Any test order under which testing is not completed will not be counted against the annual limit established in paragraph (f) of this section.

[41 FR 31483, July 28, 1976, as amended at 43 FR 4552, Feb. 2, 1978]

§ 86.604 Testing by the Administrator.

(a) The Administrator may require by test order that vehicles of a specified configuration be selected in a manner designated by him and submitted to him at such place as he may designate for the purpose of conducting emission tests. Such tests shall be conducted in accordance with § 86.608 of these regulations to determine whether vehicles manufactured by the manufacturer conform with the regulations with respect to which the certificate of conformity was issued.

(b)(1) Whenever the Administrator conducts a test on a test vehicle or the Administrator and manufacturer each conduct a test on the same test vehicle, the results of the Administrator's test shall comprise the official data for that vehicle.

(2) Whenever the manufacturer conducts all tests on a test vehicle, the manufacturer's test data will be accepted as the official data: *Provided*, That if the Administrator makes a determination based on testing under paragraph (a) of this section that there is a substantial lack of agreement between the manufacturer's test results and the Administrator's test results, no manufacturer's test data from the manufacturer's test facility will be accepted for purposes of this subpart.

(c) In the event that testing conducted under paragraph (a) of this section demonstrates a lack of agreement under paragraph (b)(2), of this section, the Administrator will:

(1) Notify the manufacturer in writing of his determination that the test facility is inappropriate for conducting the tests required by this subpart and the reasons therefor, and

(2) Reinstate any manufacturer's data upon a showing by the manufacturer that the data acquired under paragraph (a) of this section was erroneous and the manufacturer's data was correct.

(d) The manufacturer may request in writing that the Administrator reconsider his determination in paragraph (b)(2) of this section based on data or information which indicates that changes have been made to the test facility and such changes have resolved the reasons for disqualification.

§ 86.605 Maintenance of records; submittal of information.

(a) The manufacturer of any new motor vehicle subject to any of the standards or procedures prescribed in this part shall establish, maintain and retain the following adequately organized and indexed records:

(1) *General records.* (i)(A) Identification and description of all vehicles tested pursuant to a test order issued under this part. (B) A description of all emission control systems which are installed on or incorporated in each test vehicle. (C) A description of all procedures used to test each of such vehicles.

(ii) A properly filed application for certification, following the format prescribed by the EPA for the appropriate model year, fulfills each of the requirements of paragraph (a)(1)(i) of this section.

(iii) Test equipment description, including:

(A) Dynamometer.

(*1*) Inertia loading.

(*2*) Road load power absorption at 50 m.p.h.

(*3*) Manufacturer, model and serial number.

(B) Constant Volume Sampler.

(*1*) Pressure of the mixture of exhaust and dilution air entering the positive displacement pump, pressure increase across the pump, and the temperature set point of the temperature control system.

(*2*) Number of revolutions of the positive displacement pump accumulated while test is in progress and exhaust samples are being collected.

(*3*) Humidity of dilution air.

(*4*) Manufacturer, model, type and serial number.

(C) Instrumentation.

(*1*) Manufacturer, model and serial number for each analyzer.

(*2*) Pertinent information such as tuning, gain, ranges and calibration data.

(*3*) Identification of zero, span, exhaust gas and dilution air sample traces.

(*4*) Temperature set point of heated sample line and heated hydrocarbon detector temperature control system (for diesel vehicles only).

(D) Test cell.

(*1*) Barometric pressure, ambient temperature and humidity.

(*2*) Date and time of day.

(E) Additional required records for diesel vehicles.

(*1*) Pressure and temperature of the dilute exhaust mixture (and background air if sampled) at the inlet to the gas meter or flow measurement instrumentation used for particulate sampling.

(*2*) The temperature of the dilute exhaust mixture inside the dilution tunnel near particulate probe inlet.

(*3*) Gas meter or flow measurement instrumentation readings at the start of each sample period and at the end of each sample period.

(*4*) The stabilized pre-test weight and post-test weight of each particulate sample filter.

(*5*) The temperature and humidity of the ambient air in which the particulate filters were stabilized.

(iv) In lieu of recording test equipment information, reference to a vehicle test cell number may be used, with the advance approval of the Administrator: *Provided,* The test cell records show the pertinent information.

(2) *Individual records.* (i) A complete record of all emission tests performed pursuant to this subpart (except tests performed by EPA directly), including all individual worksheets and/or other documentation relating to each such test, or exact copies thereof; the date, time, purpose, and location of each test; the number of miles accumulated on the vehicle when the test began and ended; and the names of supervisory personnel responsible for the conduct of the test.

(ii) A record and description of any repairs performed prior to and/or subsequent to approval by the Administrator, giving the date and time of the repair, the reason for it, the person authorizing it, and the names of supervisory personnel responsible for the conduct of the repair.

(iii) The dates when the vehicle was shipped from the assembly plant or storage facility, and when it was received by the testing facility.

(iv) A brief description of any significant events, commencing with the batch sample selection process, but not described by an entry under one of the previous headings, including such extraordinary events as vehicle accident.

(v) The drive wheel tire pressure for each test vehicle, the inertia weight class and the actual curb weight for each test vehicle required to be weighed pursuant to a test order.

(b) All records required to be maintained under this subpart shall be retained by the manufacturer for a period of one (1) year after completion of all testing in response to a test order. Records may be retained as hard copy or reduced to microfilm, punch cards, etc., depending upon the

record retention procedures of the manufacturer: *Provided*, That in every case all the information contained in the hard copy shall be retained.

(c) The manufacturer shall, pursuant to a request made by the Administrator, submit to the Administrator the following information with regard to vehicle production:

(1) Number of vehicles, by configuration and assembly plant, scheduled for production for the time period designated in the request.

(2) Number of vehicles, by configuration and assembly plant, produced during the time period designated in the request which are complete for introduction into commerce.

(d) Nothing in this section shall limit the Administrator's discretion to require the manufacturer to retain additional records or submit information not specifically required by this section.

(e) All reports, submissions, notifications and requests for approvals made under this subpart shall be addressed to:

Director, Manufacturers Operations Division EN-340), U.S. Environmental Protection Agency, 401 M Street, SW, Washington, D.C. 20460.

[41 FR 31483, July 28, 1976, as amended at 43 FR 4552, Feb. 2, 1978; 44 FR 61962, Oct. 29, 1979; 45 FR 14524, Mar. 5, 1980]

§ 86.606 Entry and access.

(a) In order to allow the Administrator to determine whether a manufacturer is complying with the provisions of a test order and the provisions of this subpart, a manufacturer shall admit any EPA Enforcement Officer during operating hours upon demand and upon presentation of credentials to any of the following:

(1) Any facility where any vehicle to be introduced into commerce is manufactured, assembled, or stored;

(2) Any facility where any tests conducted pursuant to a test order or any procedures or activities connected with such tests are or were performed;

(3) Any facility where any vehicle which is being, was, or is to be tested is present; and

(4) Any facility where any record or other document relating to any of the above is located.

(b) Upon admission to any facility referred to in paragraph (a) of this section, any EPA Enforcement Officer shall be allowed:

(1) To inspect and monitor any part or aspect of such procedures, activities, manufacturing, assembly, storage and testing facilities, including, but not limited to, monitoring vehicle selection, preparation, preconditioning, mileage accumulation, emission tests, maintenance, and vehicle soak and storage procedures; and to verify calibration of test equipment;

(2) To inspect and monitor any aspects of vehicle manufacture, assembly or storage and other procedures;

(3) To inspect and make copies of any records or documents, related to the selection and testing of a vehicle in compliance with a test order;

(4) To inspect and photograph any part or aspect of any such vehicle and any component used in the assembly thereof that is reasonably •related to the purpose of his entry.

(c) Any EPA Enforcement Officer shall be furnished by those in charge of a facility being inspected with such reasonable assistance as he may request to help him discharge any function listed in this subpart. A recipient of a test order is required to cause those in charge of a facility operated for his benefit to furnish such reasonable assistance without charge to EPA whether or not the recipient controls the facility.

(d) The duty to admit or cause to be admitted any EPA Enforcement Officer applies whether or not the recipient owns or controls the facility in question and applies both to domestic and to foreign manufacturers and facilities. EPA will not attempt to make any inspections which it has been informed that local foreign law forbids. However, if local foreign law makes it impossible to do what is necessary to ensure the accuracy of data generated at a facility, no informed judgment can be made that the new motor vehicles being manufactured by the manufacturer do, in fact, conform to the regulations with respect to which the certificate of conformity was issued. It is the responsibility of the manufacturer to locate its testing and manufacturing facilities in juris-

dictions where this situation will not arise.

(e) For purposes of this section:

(1) "Presentation of Credentials" shall mean display of the document designating a person as an EPA Enforcement Officer.

(2) Where vehicle storage areas or facilities are concerned, "operating hours" shall mean all times during which personnel other than custodial personnel are at work in the vicinity of the area or facility and have access to it.

(3) Where facilities or areas other than those covered by paragraph (e)(2) of this section are concerned, "operating hours" shall mean all times during which an assembly line is in operation, or vehicle assembly is taking place, or all times during which testing, repair, mileage accumulation, production or compilation of records, or any other procedure or activity related to testing, or to vehicle manufacture or assembly is being carried out in a facility.

(4) "Reasonable assistance" includes, but is not limited to, clerical, copying, interpreting and translating services, and the making available on request of personnel of the facility being inspected during their working hours to inform the EPA Enforcement Officer of how the facility operates and to answer his questions. A manufacturer may be compelled to cause the personal appearance of any employee at such a facility before an EPA Enforcement Officer by written request for his appearance, signed by the Assistant Administrator for Enforcement, served on the manufacturer. Any such employee who has been instructed by the manufacturer to appear will be entitled to be accompanied, represented and advised by counsel.

(5) Any entry without 24 hours prior written or oral notification to the affected manufacturer shall be authorized in writing by the Assistant Administrator for Enforcement.

§ 86.607 Sample selection.

(a) Vehicles comprising a batch sample which are required to be tested, pursuant to a test order in accordance with this subpart, will be selected in the manner specified in the test order from a batch of vehicles of the configuration specified in the test order. The manufacturer will select test vehicles in the specified manner from the final vehicle inspection point or storage facility as specified in the test order. If the test order specifies that vehicles comprising the batch sample must be selected randomly, the random sampling will be obtained by consecutively numbering each of the vehicles in the batch at the final vehicle inspection point or at the storage facility and then using a table of random numbers to select the number of vehicles as specified in paragraph (c) of this section based on the batch size designated by the Administrator in the test order. An alternative random sampling plan may be employed: *Provided,* That the manufacturer requests approval of such a plan in advance of receipt of a test order and that the Administrator approves such a plan. If the test order does not specify that test vehicles must be randomly selected, the manufacturer shall select test vehicles consecutively. Any vehicles in the batch designated as special order may be exempted from the test vehicle selection in a manner prescribed in the test order.

(b) For 1976 and later model years the designated Acceptable Quality Level is 40 percent. The appropriate sampling plans associated with the designated AQL are contained in Appendix VIII, Tables II and III.

(c) The appropriate batch sample size will be determined by reference to Appendix VIII, Tables I and II. A code letter is obtained from Table I based on the batch size designated by the Administrator in the test order. The batch sample size will be equal to the maximum cumulative test sample size for the appropriate code letter obtained from Table I plus an additional 10 percent rounded off to the next highest number.

(d) If the test order specifies that vehicles comprising the batch sample must be selected randomly, individual vehicles comprising the test sample will be randomly selected from the batch sample using the same random selection plan as in paragraph (a) of this section. Test sample size will be determined by entering Table II in Ap-

pendix VIII at the code letter obtained from Table I.

(e) The test vehicles of the configuration selected for testing shall have been assembled by the manufacturer for distribution in commerce using his normal mass production processes.

(f) No quality control, testing, assembly or selection procedures shall be used on the completed vehicle or any portion thereof, including parts and subassemblies, that will not be used during the production and assembly of all other vehicles of that configuration which will be distributed in commerce.

(g) Unless otherwise indicated in the test order, the manufacturer shall begin selection of test vehicles from the production batch of the configuration specified in the test order next scheduled after receipt of the test order.

(h) The test order may specify that EPA Enforcement Officers, rather than the manufacturer, will select the test vehicles according to the method described in paragraph (a) of this section.

(i) The manufacturer shall keep on hand all untested vehicles in the batch sample until the batch is accepted or rejected in accordance with § 86.610. The manufacturer may ship any tested vehicle which has not failed in accordance with § 86.610(a). However, once a manufacturer ships any vehicle from any batch sample, he relinquishes the prerogative to conduct retests as provided in § 86.608(i).

[41 FR 31483, July 28, 1976, as amended at 43 FR 4552, Feb. 2, 1978]

§ 86.608 Test procedures.

(a) The prescribed test procedures are contained in Subpart B of this Part 86. For purposes of Selective Enforcement Audit testing, the manufacturer shall not perform any of the test procedures in Subpart B of this part relating to evaporative emission testing, except as specified in paragraph (a)(2) of this section.

(1) The Administrator may, on the basis of a written application by a manufacturer, prescribe test procedures other than those in Subpart B of this part for any motor vehicle which he determines is not susceptible to satisfactory testing using the procedures in Subpart B of this part.

(2) The following exceptions to the test procedures in Subpart B of this part are applicable to Selective Enforcement Audit testing:

(i) The manufacturer may use gasoline test fuel meeting the specifications of paragraph § 86.113(a) for mileage accumulation. Otherwise, the manufacturer may use fuels other than those specified in this section only with advance approval of the Administrator.

(ii) The manufacturer may measure the temperature of the test fuel at other than the approximate mid-volume of the fuel tank, as specified in paragraph § 86.131(a), and may drain the test fuel from other than the lowest point of the tank, as specified in paragraph § 86.131(b), with the advance approval of the Administrator.

(iii) The manufacturer may perform additional preconditioning on SEA test vehicles other than the preconditioning specified in § 86.132 only if the additional preconditioning had been performed on certification test vehicles of the same configuration.

(iv) The manufacturer shall perform the heat build procedure 11 to 34 hours following vehicle preconditioning rather than according to the time period specified in paragraph § 86.133(a). All references in § 86.133 to an evaporative emission enclosure (SHED) and analyzing for HC during the heat build can be ignored.

(v) The manufacturer may substitute slave tires for the drive wheel tires on the vehicle as specified in paragraph § 86.135(e): *Provided,* That the slave tires are the same size.

(vi) The cold start exhaust emission test described in § 86.137 shall follow the heat build procedure described in § 86.133 by not more than one hour.

(vii) In performing exhaust sample analysis under § 86.140.

(A) When testing diesel vehicles, the manufacturer shall allow a minimum of 20 minutes warm-up for the HC analyzer, and a minimum of 2 hours warm-up for the CO, CO_2 and NO_x analyzers. (Power is normally left on infrared and chemiluminescent analyzers. When not in use, the chopper motors of the infrared analyzers are

turned off and the phototube high voltage supply to the chemiluminescent analyzers is placed in the standby position.)

(B) The manufacturer shall exercise care to prevent moisture from condensing in the sample collection bags.

(viii) The manufacturer need not comply with § 86.142, since the records required therein are provided under other provisions of Subpart G of this part.

(ix) In addition to the requirements of Subpart B of this part, the manufacturer shall prepare gasoline-fueled vehicles as follows prior to exhaust emission testing:

(A) The manufacturer shall inspect the fuel system to insure the absence of any leaks of liquid or vapor to the atmosphere by applying a pressure of 14.5 ± 0.5 inches of water to the fuel system, allowing the pressure to stabilize, and isolating the fuel system from the pressure source. Following isolation of the fuel system, pressure must not drop more than 2.0 inches of water in 5 minutes. If required, the manufacturer shall perform corrective action in accordance with paragraph § 86.608(d) and report this action in accordance with paragraph § 86.609(d).

(B) When performing this pressure check, the manufacturer shall exercise care to neither purge nor load the evaporative emission control system.

(C) The manufacturer shall not modify the test vehicle's evaporative emission control system by component addition, deletion, or substitution, except to comply with paragraph (a)(2)(ii) of this section if approved in advance by the Administrator.

(b)(1) The manufacturer shall not adjust, repair, prepare or modify the vehicles selected for testing and shall not perform any emission tests on vehicles selected for testing pursuant to the test order unless such adjustment, repair, preparation, modification and/or tests are part of the manufacturer's prescribed end-of-line inspection procedures and are documented in the manufacturer's vehicle assembly and inspection procedures or unless such adjustments and/or tests are required or permitted under this subpart or are approved in advance by the Administrator. The manufacturer may perform adjustment, repair, preparation, modification and/or tests normally performed by his dealer or predelivery center to prepare the vehicle for delivery to a customer or the adjustment, repair, preparation, modification and/or tests normally performed at the port-of-entry by the manufacturer to prepare the vehicle for delivery to a dealer or customer: *Provided*, That such adjustment, repair, preparation, modification and/or tests are documented in written instructions or are approved by the Administrator in advance of their performance.

(2) For 1981 and later model years the Administrator may adjust or cause to be adjusted any engine or vehicle parameter which the Administrator has determined to be subject to adjustment for new vehicle compliance testing (e.g., for certification *or* Selective Enforcement Audit testing) in accordance with § 86.081-22(c)(1), to any setting within the physically adjustable range of that parameter, as determined by the Administrator in accordance with § 86.081-22(e)(3)(ii), prior to the performance of any tests. However, if the idle speed parameter is one which the Administrator has determined to be subject to adjustment, the Administrator shall not adjust it to a setting which causes a lower engine idle speed than will be possible within the physically adjustable range of the idle speed parameter on the vehicle when it has accumulated 4,000 miles, all other parameters being adjusted identically for the purpose of comparison. The Administrator, in making or specifying such adjustments, will consider the effect of the deviation from the manufacturer's recommended setting on emissions performance characteristics as well as the likelihood that similar settings will occur on in-use light-duty vehicles or light-duty trucks. In determining likelihood, the Administrator will consider factors such as, but not limited to, the effect of the adjustment on vehicle performance characteristics and surveillance information from similar in-use vehicles.

(c) The manufacturer may accumulate up to 4,000 miles on each selected vehicle prior to performing exhaust emission testing.

(1) Mileage accumulation may be performed in any manner the manufacturer desires.

(2) The manufacturer shall accumulate mileage at a minimum rate of 300 miles during each 24 hour period, unless otherwise provided by the Administrator.

(3) Mileage accumulation shall be performed on a sufficient number of test vehicles during each 24 hour period to assure that the number of vehicles tested per day fulfills the requirements of paragraph (e) of this section.

(d) No maintenance will be performed on test vehicles after a batch sample is selected for testing nor will any test vehicle substitution or replacement be allowed, unless requested of the Administrator by the manufacturer and approved by the Administrator in advance of the performance of any maintenance or vehicle substitution.

(e) The manufacturer will be allowed 24 hours to ship test vehicles from the assembly plant or storage facility to the test facility if the test facility is not located at the plant or storage facility or in close proximity to the plant or storage facility: Except, That the Administrator may approve more time based upon a request by the manufacturer accompanied by a satisfactory justification.

(f) In the event a vehicle is incapable of completing the mileage accumulation or completing the emission tests because of vehicle malfunction, the manufacturer may request that the Administrator authorize him to repair or replace the vehicle. Any replacement vehicles will be selected from the batch sample in a manner prescribed in the test order.

(g) The manufacturer shall notify the Administrator, within one working day of receipt of the test order, which test facility will be used to comply with the test order and the number of available cells at that facility. If no test cells are available at the desired facility, the manufacturer must provide alternate testing capability satisfactory to the Administrator. The manufacturer shall complete emission testing on a minimum of four vehicles per 24 hour period including voided tests for each available test cell at his testing facility: Except, That the Administrator may approve a longer period based upon a request by the manufacturer accompanied by satisfactory justification.

(h) The manufacturer shall perform test vehicle selection, preparation, mileage accumulation, shipping, and testing in such a manner as to assure that the audit is performed in an expeditious manner.

(i) The manufacturer will be permitted to retest any test vehicle: *Provided*, That all vehicles selected for testing are tested the same number of times and that not more than three tests per vehicle are performed. The manufacturer may accumulate additional mileage before conducting a retest:

[41 FR 31483, July 28, 1976, as amended at 43 FR 4552 and 4554, Feb. 2, 1978; 44 FR 2975, Jan. 12, 1979; 45 FR 14524, Mar. 5, 1980]

§ 86.609 Calculation and reporting of test results.

(a) Initial test results are calculated following the Federal Test Procedure specified in paragraph (a) of § 86.608. Round the initial test results in accordance with ASTM E29-67 to the number of places to the right of the decimal point indicated by expressing the appropriate emission standard to three significant figures.

(b) Final test results for each test vehicle shall be calculated by summing the initial test results derived in § 86.609(a) above for each test vehicle, dividing by the number of tests conducted on the vehicle, and rounding, in accordance with ASTM E29-67, to the same number of decimal places to the right of the decimal point as the initial test results.

(c) The final deteriorated test results for each test vehicle shall be calculated by multiplying the final test results by the appropriate deterioration factor derived from the certification process for the engine family and model year to which the selected configuration belongs and rounded in accordance with ASTM E29-67 to two significant figures. For the purpose of this paragraph, if a deterioration

factor as computed during the certification process is less than one, that deterioration factor shall be one.

(d) Within five working days after completion of testing of all vehicles in a batch sequence, the manufacturer shall submit to the Administrator a report which shall include the following:

(1) The location and description of the manufacturer's exhaust emission test facilities which meet the specifications of Subpart A, B, C, or D of Part 85 for 1976 model year vehicles and Subpart B of this Part 86 for 1977 and later model years as applicable, and were utilized to conduct testing reported pursuant to this section.

(2) A description of the vehicle selection method used, referencing any tables of random numbers that were used if the vehicles were randomly selected, and the name of the person in charge of the random number selection.

(3) Deterioration factors for the selected configuration.

(4) For each test conducted,

(i) Test vehicle description including:

(A) Configuration and engine family identification.

(B) Year, make, build date, and model of vehicle.

(C) Vehicle Identification Number.

(D) Miles accumulated on vehicle.

(ii) Location where mileage accumulation was conducted and description of accumulation schedule.

(iii) Test number, date, initial test results, final results and final deteriorated test results for all valid and invalid exhaust emission tests, and the reason for invalidation.

(iv) A complete description of any modification, repair, preparation, maintenance and/or testing which was performed on the test vehicle and (A) has not been reported pursuant to any other paragraph of this subpart and (B) will not be performed on all other production vehicles.

(v) Where a replacement vehicle was authorized by the Administrator, the reason for the replacement and, if any, the final test results for the replaced vehicle.

(vi) Any other information the Administrator may request relevant to the determination as to whether the new motor vehicles being manufactured by the manufacturer do in fact conform with the regulations with respect to which the certificate of conformity was issued.

(5) The following statement and endorsement:

This report is submitted pursuant to section 206 and section 208 of the Clean Air Act. All testing for which data is reported herein was conducted in strict conformance with applicable regulations under 40 CFR Part 86 et seq. All the data reported herein is a true and accurate representation of such testing. All other information reported herein is, to the best of

_____

(Company name)

knowledge, true and accurate. I am aware of the penalties associated with violations of the Clean Air Act and the regulations thereunder.

_____

(Authorized Company Representative)

[41 FR 31483, July 28, 1976, as amended at 43 FR 4552, Feb. 2, 1978; 45 FR 14524, Mar. 5, 1980]

§ 86.610 Acceptance and rejection of batches.

(a) A failed vehicle is one whose final deteriorated test results, for one or more of the regulated exhaust pollutants, when compared to the applicable emission standard for that pollutant, exceeds that standard.

(b) The batch from which a batch sample is selected will be accepted or rejected for each pollutant based upon the number of test vehicles in the batch sample with final deteriorated test results exceeding the applicable emission standards. A sufficient number of test samples of size determined by entering Appendix VIII, Table II at the appropriate code letter will be drawn from the batch sample and the vehicles tested until the cumulative number of vehicles whose final deteriorated test results exceed the emission standard for each pollutant is less than or equal to the acceptance number or greater than or equal to the rejection number appropriate for the cumulative number of vehicles tested. The acceptance and rejection numbers at the appropriate code letter

in Appendix VIII, Table II will be used in determining whether the acceptance or rejection of a batch has occurred. Once a batch is accepted or rejected for a particular pollutant, the number of vehicles whose final deteriorated test results exceed the emission standard for that pollutant shall not be considered any further for the purposes of the audit of that batch.

(c) Test samples from the batch sample shall continue to be drawn and tested until a decision of acceptance or rejection can be made with regard to each pollutant for the batch or until the batch sequence is rejected in accordance with § 86.611(a).

(d) Acceptance or rejection of a batch takes place when testing is completed on the last vehicle required to make a decision under paragraph (b) of this section.

[41 FR 31483, July 28, 1976, as amended at 43 FR 4553, Feb. 3, 1978; 45 FR 14525, Mar. 5, 1980]

§ 86.611 Acceptance and rejection of batch sequence.

(a) The manufacturer shall continue to inspect consecutive batches until the batch sequence is accepted for all pollutants or rejected for any one pollutant. A sufficient number of consecutive batches will be inspected until the cumulative number of rejected batches for each pollutant is less than or equal to the sequence acceptance number or the cumulative number of rejected batches for any one pollutant is greater than or equal to the sequence rejection number appropriate for the cumulative number of batches inspected. The number of batches required to be inspected and the batch sequence acceptance and rejection numbers shall be determined by entering Appendix VIII, Table III at the appropriate code letter.

(b) Acceptance or rejection of a batch sequence takes place when the decision is made on the last vehicle required to make a decision under paragraph (a) of this section.

(c) If the batch sequence is accepted for all regulated pollutants, the manufacturer will not be required to perform any additional testing of vehicles from subsequent batches pursuant to the initiating test order.

(d) The Administrator may terminate testing earlier than required in paragraph (a) of this section.

[41 FR 31483, July 28, 1976, as amended at 45 FR 14525, Mar. 5, 1980]

§ 86.612 Suspension and revocation of certificates of conformity.

(a) The certificate of conformity is suspended with respect to any vehicles failing pursuant to § 86.610(a), effective from the time the testing is completed.

(b) If the batch sequence is not accepted in accordance with § 86.611, batch sample selection and testing will no longer be required and the Administrator may suspend the certificate of conformity with respect to that vehicle configuration for those vehicles produced at that plant. Such suspension shall not occur before ten days after failure to accept the batch sequence.

(c) If the results of vehicle testing pursuant to these regulations indicate the vehicles of a particular configuration produced at more than one plant do not conform to the regulations with respect to which the certificate of conformity was issued, the Administrator may suspend the certificate of conformity with respect to that configuration for vehicles manufactured by the manufacturer in other plants of the manufacturer.

(d) The Administrator will notify the manufacturer in writing of any suspension or revocation of a certificate of conformity in whole or in part: Except, That the certificate of conformity is immediately suspended with respect to any vehicle failing pursuant to § 86.610(a) and as provided for in paragraph (a) of this section.

(e) The Administrator may revoke a certificate of conformity when the certificate has been suspended pursuant to paragraph (b) or (c) of this section if the proposed remedy for the nonconformity is one requiring a design change or changes to the engine and/or emission control system as described in the Application for Certification of the affected configuration.

(f) Once a certificate has been suspended for a failed vehicle as provided for in paragraph (a) of this section,

the manufacturer must take the following actions:

(1) Before the certificate is reinstated for that failed vehicle,

(i) Remedy the nonconformity, and

(ii) Demonstrate that the vehicle's final deteriorated test results conform to the applicable emission standards by retesting the vehicle in accordance with these regulations.

(2) Submit a written report to the Administrator which contains a description of the remedy and test results for each vehicle in addition to other information that may be required by this regulation.

(g) Once a certificate has been suspended pursuant to paragraph (b) or (c) of this section, the manufacturer must take the following actions before the Administrator will consider reinstating such certificate:

(1) Submit a written report to the Administrator which identifies the reason for the noncompliance of the vehicles, describes the proposed remedy, including a description of any proposed quality control and/or quality assurance measures to be taken by the manufacturer to prevent the future occurrence of the problem, and states the date on which the remedies will be implemented, and

(2) Demonstrate that the vehicle configuration for which the certificate of conformity has been suspended does in fact comply with these regulations by testing vehicles from consecutively produced batches of that vehicle configuration at the plant or plants specified by the Administrator in accordance with § 86.610 and § 86.611 and the conditions specified in the initial test order: Except, That if the manufacturer elects to continue testing individual vehicles after suspension of a certificate, the certificate is reinstated for any vehicle actually determined to have its final deteriorated test results in conformance with the applicable emission standards through testing in accordance with the applicable test procedures: *Provided*, That the Administrator had not revoked the certificate pursuant to paragraph (e) above.

(h) Once a certificate has been revoked for a configuration and the manufacturer desires to continue introduction into commerce of such configuration, the following action will be taken before the Administrator will consider reissuing such certificate:

(1) If the Administrator determines that the proposed change or changes in vehicle design may have an effect on emission performance deterioration, he will so notify the manufacturer within five working days after receipt of the report in paragraph (g) of this section whether subsequent testing under this subpart will be sufficient to evaluate the proposed change or whether additional testing will be required.

(2) After implementing the change or changes intended to remedy the nonconformity, demonstrate that the vehicle configuration for which the certificate of conformity was revoked does in fact comply with these regulations by testing vehicles from consecutively produced batches of that vehicle configuration in accordance with §§ 86.610 and 86.611 and the conditions specified in the initial test order. This testing will be considered by the Administrator to satisfy the testing requirements of § 86.077-32 or § 86.077-33 if the Administrator has so notified the manufacturer. If the subsequent audit results in acceptance of the batch sequence, the Administrator will reissue the certificate or amend the certificate to include that configuration as the case may be: *Provided*, That the manufacturer has satisfied any of the testing requirements pursuant to paragraph (h)(1) of this section. If the subsequent audit results in rejection of the batch sequence, the revocation shall remain in effect. Any design change approvals under this subpart shall be limited to the configuration affected by the test order.

(i) A manufacturer may at any time subsequent to an initial suspension of a certificate of conformity with respect to a test vehicle pursuant to paragraph (a) of this section, but not later than fifteen (15) days or such other period as may be allowed by the Administrator after notification of the Administrator's decision to suspend or revoke a certificate of conformity in whole or in part pursuant to paragraphs (b), (c) or (e) of this section, request that the Administrator grant

such manufacturer a hearing as to whether the tests have been properly conducted or any sampling methods have been properly applied.

(j) If, after the Administrator suspends or revokes a certificate of conformity pursuant to this section or notifies a manufacturer of his intent to do so under § 86.077-30(d), and prior to the commencement of a hearing under § 86.613, the manufacturer demonstrates to the Administrator's satisfaction that the decision to suspend or revoke the certificate was based on erroneous information, the Administrator will reinstate such certificate.

(l) To permit a manufacturer to avoid storing non-test vehicles when conducting an audit of a configuration subsequent to suspension or revocation of the certificate of conformity for that configuration resulting from failure of the initial audit of that configuration, he may request that the Administrator conditionally reinstate the certificate for that configuration. The Administrator may reinstate the certificate subject to the condition that the manufacturer consents to recall all vehicles of that configuration produced from the time the certificate is reinstated if the configuration fails the subsequent audit and to remedy any nonconformity at no expense to the owner.

[41 FR 31483, July 28, 1976, as amended at 43 FR 4553, Feb. 2, 1978]

§ 86.613 Hearings on suspensions and revocation of certificates of conformity.

(a) *Applicability.* The procedures prescribed by this section shall apply whenever a manufacturer requests a hearing pursuant to §§ 86.077-30(d)(6)(i), 86.612 (i).

(b) *Definitions.* The following definitions shall be applicable to this section:

(1) "Hearing Clerk" shall mean the Hearing Clerk of the Environmental Protection Agency.

(2) "Manufacturer" refers to a manufacturer contesting a suspension or revocation order directed at the manufacturer.

(3) "Party" shall include the Agency and the manufacturer.

(4) "Presiding Officer" shall mean an Administrative Law Judge appointed pursuant to 5 U.S.C. 3105 (see also 5 CFR Part 930 as amended).

(5) "Judicial Officer" shall mean an officer or employee of the Agency appointed as a Judicial Officer by the Administrator pursuant to this section who shall meet the qualifications and perform functions as follows:

(i) Officer—there may be designated for the purposes of this section one or more Judicial Officers. As work requires, there may be a Judicial Officer designated to act for the purposes of a particular case.

(ii) Qualifications—A Judicial Officer may be a permanent or temporary employee of the Agency who performs other duties for the Agency. Such Judicial Officer shall not be employed by the Office of Enforcement or have any connection with the preparation or presentation of evidence for a hearing held pursuant to this subpart.

(iii) Functions—the Administrator may consult with a Judicial Officer or delegate all or part of his authority to act in a given case under this section to a Judicial Officer: *Provided,* That this delegation shall not preclude the Judicial Officer from referring any motion or case to the Administrator when the Judicial Officer determines such referral to be appropriate.

(c) *Request for public hearing.* (1) If the manufacturer disagrees with the Administrator's decision to suspend or revoke a certificate or disputes the basis for an automatic suspension pursuant to § 86.612(a), he may request a public hearing as described in this section. Requests for such a hearing shall be filed with the Administrator not later than 15 days after the Administrator's notification of his decision to suspend or revoke unless otherwise specified by the Administrator. Two copies of such request shall simultaneously be served upon the Director of the Manufacturers Operations Division and two copies filed with the Hearing Clerk. Failure of the manufacturer to request a hearing within the time provided shall constitute a waiver of his right to such a hearing. Subsequent to the expiration of the period for requesting a hearing as of right, the Administrator may, in his discretion and for good cause shown,

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grant the manufacturer a hearing to contest the suspension or revocation.

(2) The request for a public hearing shall contain:

(i) A statement as to which vehicle configurations or engine families are to be the subject of the hearing;

(ii) A concise statement of the issues to be raised by the manufacturer at the hearing for each vehicle configuration or engine family or vehicle for which the manufacturer has requested the hearing. *Provided, however,* That in the case of the hearing requested under § 86.612(i), the hearing shall be restricted to the following issues:

(A) Whether tests were conducted in accordance with applicable regulations under this part;

(B) Whether test equipment was properly calibrated and functioning;

(C) Whether sampling procedures specified in Appendix VIII of this part were followed; and

(D) Whether there exists a basis for distinguishing vehicles produced at plants other than the one from which vehicles were tested which would invalidate the Administrator's decision under § 86.612(c);

(iii) A statement specifying reasons the manufacturer believes he will prevail on the merits on each of the issues so raised; and

(iv) A summary of the evidence which supports the manufacturer's position on each of the issues so raised.

(3) A copy of all requests for public hearings shall be kept on file in the Office of the Hearing Clerk and shall be made available to the public during Agency business hours.

(d) *Summary decision.* (1) In the case of a hearing requested under § 86.612(i), when it clearly appears from the data and other information contained in the request for a hearing that there is no genuine and substantial question of fact with respect to the issues specified in § 86.613(c)(2)(ii), the Administrator will enter an order denying the request for a hearing, and reaffirming the original decision to suspend or revoke a certificate of conformity, if such decision has been made pursuant to § 86.612(d) at any time prior to the decision to deny the request for a hearing.

(2) In the case of a hearing requested under § 86.077-30(d)(6)(i), to challenge a proposed suspension of a certificate of conformity for the reasons specified in § 86.077-30(d)(1)(i) or (d)(1)(ii) when it clearly appears from the data and other information contained in the request for a hearing that there is no genuine and substantial question of fact with respect to the issue of whether the refusal to comply with the provisions of a test order or any other requirement of § 86.603 was caused by conditions and circumstances outside the control of the manufacturer, the Administrator will enter an order denying the request for a hearing, and suspending the certificate of conformity.

(3) Any order issued under paragraphs (d)(1) or (2) of this section shall have the force and effect of a final decision of the Administrator, as issued pursuant to paragraph (w)(4) of this section.

(4) If the Administrator determines that a genuine and substantial question of fact does exist with respect to any of the issues referred to in paragraphs (d)(1) and (2) of this section, he shall grant the request for a hearing and publish a notice of public hearing in accordance with paragraph (h) of this section.

(e) *Filing and service.* (1) An original and two copies of all documents or papers required or permitted to be filed pursuant to this section shall be filed with the Hearing Clerk. Filing shall be deemed timely if mailed, as determined by the postmark, to the Hearing Clerk within the time allowed by this section. If filing is to be accomplished by mailing, the documents shall be sent to the address set forth in the notice of public hearing as described in paragraph (h) of this section.

(2) To the maximum extent possible, testimony shall be presented in written form. Copies of written testimony shall be served upon all parties as soon as practicable prior to the start of the hearing. A certificate of service shall be provided on or accompany each document or paper filed with the Hearing Clerk. Documents to be served upon the Director of the Manufacturers Operations Division shall be

sent by registered mail to: Director, Manufacturers Operations Division, U.S. Environmental Protection Agency (EN-340), 401 M Street, SW., WSM, Washington, D.C. 20460. Service by registered mail is complete upon mailing.

(f) *Time.* (1) In computing any period of time prescribed or allowed by this section, except as otherwise provided, the day of the act or event from which the designated period of time begins to run shall not be included. Saturdays, Sundays, and Federal legal holidays shall be included in computing any such period allowed for the filing of any document or paper, except that when such period expires on a Saturday, Sunday, or Federal legal holiday, such period shall be extended to include the next following business day.

(2) A prescribed period of time within which a party is required or permitted to do an act shall be computed from the time of service, except that when service is accomplished by mail, three days shall be added to the prescribed period.

(g) *Consolidation.* The Administrator or the Presiding Officer in his discretion may consolidate two or more proceedings to be held under this section for the purpose of resolving one or more issues whenever it appears that such consolidation will expedite or simplify consideration of such issues. Consolidation shall not affect the right of any party to raise issues that could have been raised if consolidation had not occurred.

(h) *Notice of public hearings.* (1) Notice of a public hearing under this section shall be given by publication in the FEDERAL REGISTER and by such other means as the Administrator finds appropriate to provide notice to the public. To the extent possible hearings under this section shall be scheduled to commence within 14 days of receipt of the application in paragraph (c) of this section.

(i) *Amicus curiae.* Persons not parties to the proceeding wishing to file briefs may do so by leave of the Presiding Officer granted on motion. A motion for leave shall identify the interest of the applicant and shall state the reasons why the proposed amicus brief is desirable.

(j) *Presiding Officer.* The Presiding Officer shall have the duty to conduct a fair and impartial hearing in accordance with 5 U.S.C. sections 554, 556 and 557 and to take all necessary action to avoid delay in the disposition of the proceedings and to maintain order. He shall have all power consistent with Agency rule and with the Administrative Procedure Act necessary to this end, including the following:

(1) To administer oaths and affirmations;

(2) To rule upon offers of proof and exclude irrelevant or repetitious material;

(3) To regulate the course of the hearings and the conduct of the parties and their counsel therein;

(4) To hold conferences for simplification of the issues or any other proper purpose;

(5) To consider and rule upon all procedural and other motions appropriate in such proceedings;

(6) To require the submission of direct testimony in written form with or without affidavit whenever, in the opinion of the Presiding Officer, oral testimony is not necessary for full and true disclosure of the facts;

(7) To enforce agreements and orders requiring access as authorized by law;

(8) To require the filing of briefs on any matter on which he is required to rule;

(9) To require any party or any witness, during the course of the hearing, to state his position on any issue;

(10) To take or cause depositions to be taken whenever the ends of justice would be served thereby;

(11) To make decisions or recommend decisions to resolve the disputed issues on the record of the hearing;

(12) To issue, upon good cause shown, protective orders as described in paragraph (n) of this section.

(k) *Conferences.* (1) At the discretion of the Presiding Officer, conferences may be held prior to or during any hearing. The Presiding Officer shall direct the Hearing Clerk to notify all parties of the time and location of any such conference. At the discretion of the Presiding Officer, persons other

than parties may attend. At a conference the Presiding Officer may:

(i) Obtain stipulations and admissions, receive requests and order depositions to be taken, identify disputed issues of fact and law, and require or allow the submission of written testimony from any witness or party;

(ii) Set a hearing schedule for as many of the following as are deemed necessary by the Presiding Officer:

(A) Oral and written statements;

(B) Submission of written direct testimony as required or authorized by the Presiding Officer;

(C) Oral direct and cross-examination of a witness where necessary as prescribed in paragraph (p) of this section: and

(D) Oral argument, if appropriate.

(iii) Identify matters of which official notice may be taken;

(iv) Consider limitation of the number of expert and other witnesses;

(v) Consider the procedure to be followed at the hearing; and

(vi) Consider any other matter that may expedite the hearing or aid in the disposition of the issue.

(2) The results of any conference including all stipulations shall, if not transcribed, be summarized in writing by the Presiding Officer and made part of the record.

(l) *Primary discovery* (exchange of witness lists and documents). (1) At a prehearing conference or within some reasonable time set by the Presiding Officer prior to the hearing, each party shall make available to the other parties the names of the expert and other witnesses the party expects to call, together with a brief summary of their expected testimony and a list of all documents and exhibits which the party expects to introduce into evidence. Thereafter, witnesses, documents, or exhibits may be added and summaries of expected testimony amended upon motion by a party.

(2) The Presiding Officer, may, upon motion by a party or other person, and for good cause shown, by order (i) restrict or defer disclosure by a party of the name of a witness or a narrative summary of the expected testimony of a witness, and (ii) prescribe other appropriate measures to protect a witness. Any party affected by any such action shall have an adequate opportunity, once he learns the name of a witness and obtains the narrative summary of his expected testimony, to prepare for the presentation of his case.

(m) *Other discovery.* (1) Except as so provided by paragraph (l) of this section, further discovery, under this paragraph, shall be permitted only upon determination by the Presiding Officer:

(i) That such discovery will not in any way unreasonably delay the proceeding;

(ii) That the information to be obtained is not obtainable voluntarily; and

(iii) That such information has significant probative value. The Presiding Officer shall be guided by the procedures set forth in the Federal Rules of Civil Procedure, where practicable, and the precedents thereunder, except that no discovery shall be undertaken except upon order of the Presiding Officer or upon agreement of the parties.

(2) The Presiding Officer shall order depositions upon oral questions only upon a showing of good cause and upon a finding that:

(i) The information sought cannot be obtained by alternative methods; or

(ii) There is a substantial reason to believe that relevant and probative evidence may otherwise not be preserved for presentation by a witness at the hearing.

(3) Any party to the proceeding desiring an order of discovery shall make a motion or motions therefor. Such a motion shall set forth:

(i) The circumstances warranting the taking of the discovery;

(ii) The nature of the information expected to be discovered; and

(iii) The proposed time and place where it will be taken.

If the Presiding Officer determines the motion should be granted, he shall issue an order for the taking of such discovery together with the conditions and terms thereof.

(4) Failure to comply with an order issued pursuant to this paragraph may lead to the inference that the information to be discovered would be adverse

to the person or party from whom the information was sought.

(n) *Protective orders, in camera proceedings.* (1) Upon motion by a party or by the person from whom discovery is sought, and upon a showing by the movant that the disclosure of the information to be discovered, or a particular part thereof, (other than emission data) would result in methods or processes entitled to protection as trade secrets of such person being divulged, the Presiding Officer may enter a protective order with respect to such material. Any protective order shall contain such terms governing the treatment of the information as may be appropriate under the circumstances to prevent disclosure outside the hearing: *Provided,* That the order shall state that the material shall be filed separately from other evidence and exhibits in the hearing. Disclosure shall be limited to parties to the hearing, their counsel and relevant technical consultants, and authorized representatives of the United States concerned with carrying out the Act. Except in the case of the government, disclosure may be limited to counsel for parties who shall not disclose such information to the parties themselves. Except in the case of the government, disclosure to a party or his counsel shall be conditioned on execution of a sworn statement that no disclosure of the information will be made to persons not entitled to receive it under the terms of the protective order. (No such provision is necessary where government employees are concerned because disclosure by them is subject to the terms of 18 U.S.C. 1905.)

(2)(i) A party or person seeking a protective order may be permitted to make all or part of the required showing in camera. A record shall be made of such in camera proceedings. If the Presiding Officer enters a protective order following a showing in camera, the record of such showing shall be sealed and preserved and made available to the agency or court in the event of appeal.

(ii) Attendance at any in camera proceeding may be limited to the Presiding Officer, the agency, and the person or party seeking the protective order.

(3) Any party, subject to the terms and conditions of any protective order issued pursuant to paragraph (n)(1) of this section, desiring for the presentation of his case to make use of any in camera documents or testimony shall make application to the Presiding Officer by motion setting forth the justification therefor. The Presiding Officer, in granting any such motion, shall enter an order protecting the rights of the affected persons and parties and preventing unnecessary disclosure of such information, including the presentation of such information and oral testimony and cross-examination concerning it in executive session, as in his discretion is necessary and practicable.

(4) In the submittal of proposed findings, briefs, or other papers, counsel for all parties shall make a good faith attempt to refrain from disclosing the specific details of in camera documents and testimony. This shall not preclude references in such proposed findings, briefs, or other papers to such documents or testimony including generalized statements based on their contents. To the extent that counsel considers it necessary to include specific details in their presentations, such data shall be incorporated in separate proposed findings, briefs, or other papers marked "confidential," which shall become part of the in camera record.

(o) *Motions.* (1) All motions, except those made orally during the course of the hearing, shall be in writing and shall state with particularity the grounds therefore, shall set forth the relief or order sought, and shall be filed with the Hearing Clerk and served upon all parties.

(2) Within such time as may be fixed by the Administrator, the judicial officer, or the Presiding Officer, as appropriate, any party may serve and file an answer to the motion. The movant shall, if requested by the Administrator, the judicial officer, or the Presiding Officer, as appropriate, serve and file reply papers, within the time set by the request.

(3) The Presiding Officer shall rule upon all motions filed or made prior to the filing of his decision or accelerated decision, as appropriate. The Adminis-

trator or the judicial officer, as appropriate, shall rule upon all motions filed prior to the appointment of a Presiding Officer and all motions filed after the filing of the decision of the Presiding Officer or accelerated decision. Oral argument of motions will be permitted only if the Presiding Officer, the Administrator or the judicial officer, as appropriate, deems it necessary.

(p) *Evidence.* (1) The official transcripts and exhibits, together with all papers and requests filed in the proceeding, shall constitute the record. Immaterial or irrelevant parts of an admissible document shall be segregated and excluded so far as practicable. Documents or parts thereof subject to a protective order under paragraph (n) of this section shall be segregated. Evidence may be received at the hearing even though inadmissible under the rules of evidence applicable to judicial proceedings. The weight to be given evidence shall be determined by its reliability and probative value.

(2) The Presiding Officer shall allow the parties to examine and cross-examine a witness to the extent that such examination and cross-examination is necessary for a full and true disclosure of the facts.

(3) Rulings of the Presiding Officer on the admissibility of evidence, the propriety of examination and cross-examination and other procedural matters shall appear in the record.

(4) Parties shall automatically be presumed to have taken exception to an adverse ruling.

(q) *Record.* (1) Hearings shall be stenographically reported and transcribed and the original transcripts shall be part of the record and the sole official transcript. Copies of the record shall be filed with the Hearing Clerk and made available during Agency business hours for public inspection. Any person desiring a copy of the record of the hearing or any part thereof, except as provided in paragraph (n) of this section, shall be entitled to the same upon payment of the cost thereof.

(2) The official transcripts and exhibits, together with all papers and requests filed in the proceeding, shall constitute the record.

(r) *Proposed findings, conclusions.* (1) Within 4 days of the close of the reception of evidence, or within such longer time as may be fixed by the Presiding Officer, any party may submit for the consideration of the Presiding Officer proposed findings of fact, conclusions of law, and a proposed order, together with reasons therefor and briefs in support thereof. Such proposals shall be in writing, shall be served upon all parties, and shall contain adequate references to the record and authorities relied upon.

(2) The record shall show the Presiding Officer's ruling on the proposed findings and conclusions except when his order disposing of the proceeding otherwise informs the parties of the action taken by him thereon.

(s) *Decision of the Presiding Officer.* (1) Unless extended by the Administrator, the Presiding Officer shall issue and file with the Hearing Clerk his decision within 14 days (or within 7 days in the case of a hearing requested under § 86.612(i)) after the period for filing proposed findings as provided for in paragraph (r) of this section has expired.

(2) The Presiding Officer's decision shall become the decision of the Administrator (i) when no notice of intention to appeal as described in paragraphs (t) and (u) of this section is filed, 10 days after issuance thereof, unless in the interim the Administrator shall have taken action to review or stay the effective date of the decision; or (ii) when a notice of intention to appeal is filed but the appeal is not perfected as required by paragraph (t) or (u) of this section, 5 days after the period allowed for perfection of an appeal has expired unless within that 5 day period, the Administrator shall have taken action to review or stay the effective date of the decision;

(3) The Presiding Officer's decision shall include a statement of findings and conclusions, as well as the reasons or basis therefore, upon all the material issues of fact or law presented on the record and an appropriate rule or order. Such decision shall be supported by substantial evidence and based upon a consideration of the whole record.

(4) At any time prior to the issuance of his decision, the Presiding Officer may reopen the proceeding for the reception of further evidence. Except for the correction of clerical errors, the jurisdication of the Presiding Officer is terminated upon the issuance of his decision.

(t) *Appeal from the decision of the Presiding Officer.* (1) Any party to a proceeding may appeal the Presiding Officer's decision to the Administrator: *Provided,* That within 10 days after issuance of the Presiding Officer's decision such party files a notice of intention to appeal and an appeal brief within 20 days of such decision.

(2) When an appeal is taken from the decision of the Presiding Officer, any party may file a brief with respect to such appeal. The brief shall be filed within 15 days of the date of the filing of the appellant's brief.

(3) Any brief filed pursuant to this paragraph shall contain in the order indicated, the following:

(i) A subject index of the matter in the brief, with page references, and a table of cases (alphabetically arranged) textbooks, statutes, and other material cited, with page references thereto;

(ii) A specification of the issues intended to be urged: *Provided, however,* That in the case of a hearing requested under § 85.612(i), the brief shall be restricted to the issues specified in paragraph (c)(2)(ii) of this section;

(iii) The argument presenting clearly the points of fact and law relied upon in support of the position taken on each issue, with specific page references to the record and the legal or other material relied upon; and

(iv) A proposed order for the Administrator's consideration if different from the order contained in the Presiding Officer's decision.

(4) No brief in excess of 40 pages shall be filed without leave of the Administrator.

(5) Oral argument will be allowed only in the discretion of the Administrator.

(u) *Summary appeal.* (1) In the case of a hearing requested under § 86.612(i), any appeal taken from the decision of the Presiding Officer shall be conducted under this paragraph.

(2) Any party to the proceeding may appeal the Presiding Officer's decision to the Administrator by filing a notice of appeal within 10 days.

(3) The notice appeal shall be in the form of a brief, and shall conform to the requirements of paragraph (t)(3) of this section.

(4) Within 10 days after a notice of appeal from the decision of the Presiding Officer is filed under this paragraph, any party may file a brief with respect to such appeal.

(5) No brief in excess of 15 pages shall be filed without leave of the Administrator.

(v) *Review of the Presiding Officer's decision in absence of appeal.* (1) If, after the expiration of the period for taking an appeal as provided for by paragraphs (t) or (u) of this section, no notice of intention to appeal the decision of the Presiding Officer has been filed, or if filed, not perfected, the Hearing Clerk shall so notify the Administrator.

(2) The Administrator, upon receipt of notice from the Hearing Clerk that no notice of intention to appeal has been filed, or if filed, not perfected pursuant to paragraphs (t) or (u) of this section, may, on his own motion, within the time limits specified in paragraph (s)(2) of this section, review the decision of the Presiding Officer. Notice of the intention of the Administrator to review the decision of the Presiding Officer shall be given to all parties and shall set forth the scope of such review and the issues which shall be considered and shall make provision for filing of briefs.

(w) *Decision of appeal or review.* (1) Upon appeal from or review of the Presiding Officer's decision, the Administrator shall consider such parts of the record as are cited or as may be necessary to resolve the issues presented and in addition shall, to the extent necessary or desirable, exercise all the powers which he could have exercised if he had presided at the hearing.

(2) In rendering his decision, the Administrator shall adopt, modify or set aside the findings, conclusions, and order contained in the decision of the Presiding Officer and shall set forth in his decision a statement of the reasons or bases for his action.

(3) In those cases where the Administrator believes that he should have further information or additional views of the parties as to the form and content of the rule or order to be issued, the Administrator, in his discretion, may withhold final action pending the receipt of such additional information or views, or may remand the case to the Presiding Officer.

(4) Any decision rendered under this paragraph which completes disposition of a case shall be a final decision of the Administrator.

(x) *Reconsideration.* Within twenty (20) days after issuance of the Administrator's decision, any party may file with the Administrator a petition for reconsideration of such decision, setting forth the relief desired and the grounds in support thereof. Any petition filed under this subsection must be confined to new questions raised by the decision or final order and upon which the petitioner had no opportunity to argue before the Presiding Officer or the Administrator: *Provided, however,* That in the case of a hearing requested under § 86.612(i) such new questions shall be limited to the issues specified in paragraph (c)(2)(ii) of this section. Any party desiring to oppose such a petition shall file an answer thereto within ten (10) days after the filing of the petition. The filing of a petition for reconsideration shall not operate to stay the effective date of the decision or order or to toll the running of any statutory time period affecting such decision or order unless specifically so ordered by the Administrator.

(y) *Accelerated decision, dismissal.* (1) The Presiding Officer, upon motion of any party or sua sponte, may at any time render an accelerated decision in favor of the Agency or the manufacturer as to all or any part of the proceeding, without further hearing or upon such limited additional evidence such as affidavits as he may require, or dismiss any party with prejudice, for any of the following reasons:

(i) Failure to state a claim upon which relief can be granted, or direct or collateral estoppel;

(ii) The lack of any genuine issue of material fact, causing a party to be entitled to judgment as a matter of law; or

(iii) Such other and further reasons as are just, including specifically failure to obey a procedural order of the Presiding Officer.

(2) If under this paragraph an accelerated decision is issued as to all the issues and claims joined in the proceeding, the decision shall be treated for the purposes of these procedures as the decision of the Presiding Officer as provided in paragraph (s) of this section.

(3) If under this paragraph, judgment is rendered on less than all issues or claims in the proceeding, the Presiding Officer shall determine what material facts exist without substantial controversy and what material facts are actually and in good faith controverted. He shall thereupon issue an order specifying the facts which appear without substantial controversy, and the issues and claims upon which the hearing will proceed.

(z) *Conclusion of hearing.* (1) If, after the expiration of the period for taking an appeal as provided for by paragraphs (t) and (u) of this section, no appeal has been taken from the Presiding Officer's decision, and after the expiration of the period for review by the Administrator on his own motion as provided for by paragraph (v) of this section, the Administrator does not move to review such decision, the hearing will be deemed to have ended at the expiration of all periods allowed for such appeal and review.

(2) If an appeal of the Presiding Officer's decision is taken pursuant to paragraphs (t) and (u) of this section, or if, in the absence of such appeal the Administrator moves to review the decision of the Presiding Officer pursuant to paragraph (v) of this section, the hearing will be deemed to have ended upon rendering of a final decision by the Administrator.

(aa) *Judicial review.* (1) The Administrator hereby designates the General Counsel, Environmental Protection Agency as the officer upon whom copy of any petition for judicial review shall be served. Such officer shall be responsible for filing in the court the record on which the order of the Administrator is based.

(2) Before forwarding the record to the court, the Agency shall advise the petitioner of costs of preparing it and as soon as payment to cover fees is made, shall forward the record to the court.

[41 FR 31483, July 28, 1976, as amended at 43 FR 4553, Feb. 2, 1978; 44 FR 61962, Oct. 29, 1979]

Subpart I—Emission Regulations for New Diesel Heavy Duty Engines; Smoke Exhaust Test Procedure

SOURCE: 40 FR 27593, June 30, 1975, unless otherwise noted.

§ 86.877-1 General applicability.

The provisions of this subpart are applicable to new Diesel heavy duty engines beginning with the 1977 model year.

§ 86.877-2 Definitions.

The definitions in § 86.077-2 apply to this subpart.

§ 86.877-3 Abbreviations.

The abbreviations in § 86.077-3 apply to this subpart.

§ 86.877-4 Section numbering.

The section numbering system set forth in § 86.877-4(a) applies to this subpart.

§ 86.877-5 Test procedures.

The procedures described in this and subsequent sections will be the test program to determine the conformity of engines with the standard set forth in § 86.077-11(a).

(a) The test consists of a prescribed sequence of engine operating conditions on an engine dynamometer with continuous examination of the exhaust gases. The test is applicable equally to controlled engines equipped with means for preventing, controlling, or eliminating smoke emissions and to uncontrolled engines.

(b) The test is designed to determine the opacity of smoke in exhaust emissions during those engine operating conditions which tend to promote smoke from diesel-powered vehicles.

(c) The test procedure begins with a warm engine which is then run through preloading and preconditioning operations. After an idling period, the engine is operated through acceleration and lugging modes during which smoke emission measurements are made to compare with the standards. The engine is then returned to the idle condition and the acceleration and lugging modes are repeated. Three sequences of acceleration and lugging constitute the full set of operating conditions for smoke emission measurement.

(d) Except in cases of component malfunction or failure, all emission control systems installed on or incorporated in a new motor vehicle engine shall be functioning during all procedures in this subpart. Maintenance to correct component malfunction or failure shall be authorized in accordance with § 86.077-24.

§ 86.877-6 Diesel fuel specifications.

(a) The Diesel fuels employed shall be clean and bright, with pour and cloud points adequate for operability. The fuels may contain nonmetallic additives as follows: Cetane improper, metal deactivator, antioxidant, dehazer, antirust, pour depressant, dye, and dispersant.

(b) Fuel meeting the following specifications, or substantially equivalent specifications approved by the Administrator, shall be used in exhaust emission testing. The grade of fuel recommended by the engine manufacturer, commercially designated as "Type 1-D" or "Type 2-D" shall be used.

Item	ASTM test method No.	Type 1-D	Type 2-D
Cetane	D613	48-54	42-50
Distillation Range	D86		
IBP, F		330-390	340-400
10 percent point, F		370-430	400-460
50 percent point, F		410-480	470-540
90 percent point, F		460-520	550-610
EP, F		500-560	580-660
Gravity, API	D287	40-44	33-37

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Item	ASTM test method No.	Type 1-D	Type 2-D
Total sulfur, percent	D129 or D2622	0.05-0.20	0.2-0.5
Hydrocarbon composition	D1139		
Aromatics, percent		8-15	27 (Min.)
Paraffins, Naphthenes, Olefins		Remainder	Remainder
Flash point, F (Min.)	D93	120	130
Viscosity, centistokes	D445	1.6-2.0	2.0-3.2

(c) Fuel meeting the following specifications, or substantially equivalent specifications approved by the Administrator, shall be used in service accumulation. The grade of fuel recommended by the engine manufacturer, commercially designated as "Type 1-D" or "Type 2-D", shall be used.

Item	ASTM test method No.	Type 1-D	Type 2-D
Cetane	D613	48-54	42-5
Distillation range	D86		
IBP, F		330-390	340-410
10 percent point, F		370-430	400-470
50 percent point, F		410-480	470-540
90 percent point, F		460-520	550-610
EP, F		500-560	580-660
Gravity, API	D287	40-44	33-40
Total sulfur, percent	D129 or D2622	0.05-0.20	0.2-0.5
Flash point, F (min.)	D93	120	130
Viscosity, centistokes	D445	1.6-2.0	2.0-3.2

(d) The type fuel, including additive and other specifications, used under paragraphs (b) and (c) of this section shall be reported in accordance with § 86.077-21(b)(3).

§ 86.877-7 Dynamometer operation cycle for smoke emission tests.

(a) The following sequence of operations shall be performed during engine dynamometer testing of smoke emissions, starting with the dynamometer preloading determined and the engine preconditioned (§ 85.877-12(c)).

(1) *Idle mode.* The engine is caused to idle for 5 to 5.5 minutes at the manufacturer's recommended low idle speed. The dynamometer controls shall be set to provide minimum load by turning the load switch to the "off" position or by adjusting the controls to the minimum load position.

(2) *Acceleration mode.* (i) The engine speed shall be increased to 200±50 r.p.m. above the manufacturer's recommended low idle speed within 3 seconds.

(ii) Immediately upon completion of the mode specified in paragraph (a)(2)(i) of this section, the throttle shall be moved rapidly to, and held in, the fully-open position. The inertia of the engine and the dynamometer, or alternately a preselected dynamometer load, shall be used to control the acceleration of the engine so that the speed increases to 85 percent of the rated speed in 5±1.5 seconds. This acceleration shall be linear within 100 r.p.m. as specified in § 86.877-13(c).

(iii) After the engine reaches the speed required in paragraph (a)(2)(ii) of this section, the throttle shall be moved rapidly to, and held in, the fully-closed position. Immediately after the throttle is closed, the preselected load required to perform the acceleration in paragraph (a)(2)(iv) of this section shall be applied.

(iv) When the engine decelerates to the maximum torque speed or 60 percent of rated speed (within 50 r.p.m.), whichever is higher, the throttle shall be moved rapidly to, and held in, the fully-open position. The preselected dynamometer load which was applied during the preceding transition period shall be used to control the acceleration of the engine so that the speed increases to at least 95 percent of the rated speed in 10±2 seconds.

(3) *Lugging mode.* (i) Immediately upon completion of the preceding acceleration mode, the dynamometer

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controls shall be adjusted to permit the engine to develop maximum horsepower at rated speed. This transition period shall be 50 to 60 seconds in duration. During the last ten seconds of this period, the engine speed shall be maintained within 50 r.p.m. of the rated speed, and the power (corrected, if necessary, to rating conditions) shall be no less than 95 percent of the maximum horsepower developed during zero-hour testing.

(ii) With the throttle remaining in the fully-open position, the dynamometer controls shall be adjusted gradually so that the engine speed is reduced to the maximum torque speed or to 60 percent of the rated speed (within 50 r.p.m.), whichever is higher. This lugging operation shall be performed smoothly over a period of 35 ± 5 seconds. The rate of slowing of the engine shall be linear, within 100 r.p.m., as specified in § 86.877-13(c).

(4) *Engine unloading.* Immediately after completion of the preceding lugging mode, the dynamometer and engine controls shall be returned to the idle position described in paragraph (a)(1) of this section. The engine must be at the low idle condition within one minute after completion of the lugging mode.

(b) The procedures described in paragraphs (a)(1) through (a)(4) of this section shall be repeated until three consecutive valid cycles have been completed. If three valid cycles have not been completed after a total of six consecutive cycles have been run, the engine shall be preconditioned by operation at maximum horsepower at rated speed for 10 minutes before the test sequence is repeated.

[40 FR 27593, June 30, 1975, as amended at 41 FR 29393, July 16, 1976]

§ 86.877-8 Dynamometer and engine equipment.

The following equipment shall be used for smoke emission testing of engines on engine dynamometers.

(a) An engine dynamometer with adequate characteristics to perform the test cycle described in § 86.877-7.

(b) An engine cooling system having sufficient capacity to maintain the engine at normal operating temperatures during conduct of the prescribed engine tests.

(c) A noninsulated exhaust system extending 15±5 feet from the exhaust manifold, or the crossover junction in the case of Vee engines, and presenting an exhaust back pressure within ±0.2 inch Hg. of the upper limit at maximum rated horsepower, as established by the engine manufacturer in his sales and service literature for vehicle application. A conventional automotive muffler of a size and type commonly used with the engine being tested shall be employed in the exhaust system during smoke emission testing. The terminal 2 feet of the exhaust pipe shall be circular cross section and be free of elbows and bends. The end of the pipe shall be cut off squarely. The terminal 2 feet of the exhaust pipe shall have a diameter in accordance with the engine being tested, as specified below:

Maximum rated horsepower	Exhaust pipe diameter (inches)
Less than 101	2
101 to 200	3
201 to 300	4
301 or more	5

(d) An engine air inlet system presenting an air inlet restriction within ±1 inch of water of the upper limit for the engine operating condition which results in maximum air flow, as established by the engine manufacturer in his sales and service literature, for the engine being tested.

§ 86.877-9 Smoke measurement system.

(a) *Schematic drawing.* The following figure (fig. I877-1) is a schematic drawing of the optical system of the light extinction meter.

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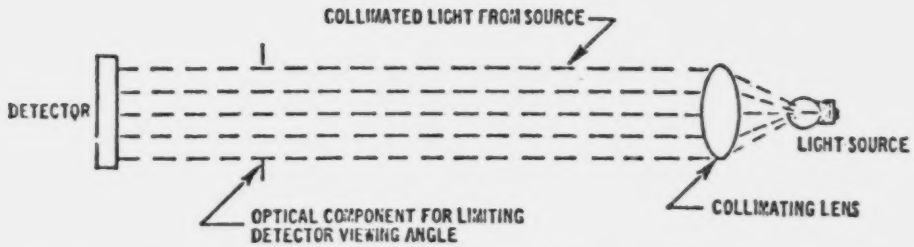

Figure I877-1. - EPA smokemeter optical system (schematic).

(b) *Equipment.* The following equipment shall be used in the system:

(1) Adapter—the smokemeter optical unit may be mounted on a fixed or movable frame. The normal unrestricted shape of the exhaust plume shall not be modified by the adapter, the meter, or any ventilator system used to remove the exhaust from the test site.

(2) Smoke-meter (light extinction meter)—continuous recording, full-flow light obscuration meter. It shall be positioned near the end of the exhaust pipe so that a built-in light beam traverses the exhaust smoke plume which issues from the pipe at right angles to the axis of the plume. The light source is an incandescent lamp operated at a constant voltage of not less than 15 percent of the manufacturer's specified voltage. The lamp output is collimated to a beam with a nominal diameter of 1.125 inches. The angle of divergence of the collimated beam shall be within 4° included angle. A light detector, directly opposed to the light source, measures the amount of light blocked by the smoke in the exhaust. The detector sensitivity is restricted to the visual range and comparable to that of the human eye. A collimating tube with apertures equal to the beam diameter is attached to the detector. It restricts the viewing angle of the detector to within 16° included angle. An amplified signal corresponding to the amount of light blocked is recorded continuously on a remote recorder. An air curtain across the light source and detector window assemblies may be used to minimize deposition of smoke particles on those surfaces provided that it does not measurably affect the opacity of the plume. The meter consists of two units, an optical unit and a remote control unit. Light extinction meters employing substantially identical measurement principles and producing substantially equivalent results but which employ other electronic and optical techniques may be used only after having been approved in advance by the Administrator.

(3) Recorder—a continuous recorder, with variable chart speed over a minimal range of 0.5 to 8.0 inches per minute (or equivalent) and an automatic marker indicating 1-second intervals shall be used for continuously recording the exhaust gas opacity, engine r.p.m. and throttle position. The recorder shall be equipped to indicate only when the throttle is in the fully-open or fully-closed position. The recorder scale for opacity shall be linear and calibrated to read from 0 to 100 percent opacity full scale. The opacity trace shall have a resolution within 1 percent opacity. The recorder scale for engine r.p.m. shall be linear and have a resolution of 30 r.p.m. The throttle position trace must clearly indicate when the throttle is in the fully-open and fully-closed positions. Any means other than a strip-chart recorder may be used provided it produced a permanent visual data record of quality equal to or better than that described above.

(4) The recorder used with the smokemeter shall be capable of full-scale deflection in 0.5 second or less. The smokemeter-recorder combination may be damped so that signals with a frequency higher than 10 cycles per second are attenuated. A separate low-pass electronic filter with the following performance characteristics may be installed between the smokemeter

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and the recorder to achieve the high-frequency attenuation.

(i) 3 decibel point—10 cycles per second.

(ii) Insertion loss-zero ±0.5 decibels.

(iii) Selectivity—12 decibels per octave above 10 cycles per second.

(iv) Attenuation—27 decibels down at 40 cycles per second minimum.

(c) *Assembling equipment.* (1) The optical unit of the smokemeter shall be mounted radially to the exhaust pipe so that the measurement will be made at right angles to the axis of the exhaust plume. The distance from the optical centerline to the exhaust pipe outlet shall be 5±1 inch. The full flow of the exhaust stream shall be centered between the source and detector apertures (or windows and lenses) and on the axis of the light beam.

(2) Power shall be supplied to the control unit of the smokemeter in time to allow at least 15 minutes for stabilization prior to testing.

§ 86.877-10 Information to be recorded.

The following information shall be recorded with respect to each test:

(a) Test number.

(b) Date and time of day.

(c) Instrument operator.

(d) Engine operator.

(e) Engine Identification numbers—Date of manufacture—Number of hours of operation accumulated on engine—Engine family—Exhaust pipe diameter—Fuel injector type—Maximum measured fuel rate at maximum measured torque and horsepower—Air aspiration system—Low idle r.p.m.—Maximum governed r.p.m.—Maximum measured horsepower at r.p.m.—Maximum measured torque at r.p.m.—Exhaust system back pressure—Air inlet restriction.

(f) Smokemeter: Number—Zero control setting—Calibration control setting—Gain.

(g) Recorder chart: Identify zero traces—Calibration traces—Idle traces—Closed throttle trace, open throttle trace—Acceleration and lug-down test traces—Start and finish of each test.

(h) Ambient temperature in dynamometer testing room.

(i) Engine intake air temperature and humidity.

(j) Barometric pressure.

(k) Observed engine torque and speed during the steady-state test conditions specified in § 86.877-7(a)(3)(i).

§ 86.877-11 Instrument checks.

(a) The smokemeter shall be checked according to the following procedure prior to each test:

(1) The optical surfaces of the optical section shall be checked to verify that they are clean and free of foreign material and fingerprints.

(2) The zero control shall be adjusted under conditions of "no smoke" to give a recorder trace of zero.

(3) Calibrated neutral density filters having approximately 10, 20, and 40 percent opacity shall be employed to check the linearity of the instrument. The filter(s) shall be inserted in the light path perpendicular to the axis of the beam and adjacent to the opening from which the beam of light from the light source emanates, and the recorder response shall be noted. The nominal opacity value of the filter shall be confirmed by the Administrator semi-annually. Deviations in excess of 1 percent of the nominal opacity shall be corrected.

(b) The instruments for measuring and recording engine r.p.m., engine torque, air inlet restrictions, exhaust system back pressure, throttle position, etc., which are used in the tests prescribed herein, shall be calibrated in accordance with good engineering practice.

[40 FR 27593, June 30, 1975, as amended at 41 FR 29393, July 16, 1976]

§ 86.877-12 Test run.

(a) The temperature of the air supplied to the engine shall be between 68° F. and 86° F. The observed barometric pressure shall be between 28.5 inches and 31 inches Hg. Higher air temperature or lower barometric pressure may be used, if desired, but no allowance will be made for possible increased smoke emissions because of such conditions.

(b) The governor and fuel system shall have been adjusted to provide engine performance at the levels specified by the engine manufacturer for maximum rated horsepower and maxi-

mum rated torque. These specifications shall be reported in accordance with § 86.077-21(b)(3).

(c) The following steps shall be taken for each test:

(1) Start cooling system.

(2) Starting with a warmed engine, determine by experimentation the dynamometer inertia and dynamometer load required to perform the acceleration in the dynamometer cycle for smoke emission tests (§ 86.877-7(a)(2)). In a manner appropriate for the dynamometer and controls being used, arrange to conduct the acceleration mode.

(3) Install smokemeter optical unit and connect it to the recorder. Connect the engine r.p.m. and torque sensing devices to the recorder.

(4) Turn on purge air to the optical unit of the smokemeter, if purge air is used.

(5) Check and record zero and span settings of the smokemeter recorder at a chart speed of approximately 1 inch per minute. (The optical unit shall be retracted from its position about the exhaust stream if the engine is left running.)

(6) Precondition the engine by operating it for 10 minutes at maximum rated horsepower.

(7) Proceed with the sequence of smoke emission measurements on the engine dynamometer as prescribed in § 86.877-7.

(8) During the test sequence of § 86.877-7, continuously record smoke measurements, engine r.p.m., and throttle position at a minimum chart speed of 1 inch per minute during the idle mode and transitional periods and 8 inches per minute during the acceleration and lugging modes. The smokemeter zero and full scale recorder deflections may be rechecked during the idle mode of each test sequence. If either zero or full scale drift is in excess of 2 percent opacity, the smokemeter controls must be readjusted and the test must be repeated.

(9) Turn off engine.

(10) Check zero and reset if necessary and check span of the smokemeter recorder by inserting neutral density filters. If either zero or span drift is in excess of 2 percent opacity, the test results shall be invalidated.

§ 86.877-13 Chart reading.

The following procedure shall be used to analyze the recorder chart.

(a) Locate the modes specified in § 86.877-7(a)(1) through (a)(4) by applying the following starting and ending criteria.

(1) The idle model specified in § 86.877-7(a)(1) starts when engine preconditioning or the lugging mode of a preceding cycle has been completed and ends when the engine speed is raised above the idle speed.

(2) The acceleration mode specified in § 86.877-7(a)(2)(i) starts when the preceding idle mode has been completed and ends when the throttle is in the fully-open position as indicated by the throttle position trace.

(3) The acceleration mode specified in § 86.877-7(a)(2)(ii) starts when the preceding acceleration mode has been completed and ends when the engine speed reaches 85 percent of the rated speed.

(4) The transition period specified in § 86.877-7(a)(2)(iii) starts when the preceding acceleration mode has been completed and ends when the throttle is in the fully-open position as indicated by the throttle position trace.

(5) The acceleration mode specified in § 86.877-7(a)(2)(iv) starts when the preceding transition period has been completed and ends when the engine speed reaches 95 percent of the rated speed.

(6) The transition period specified in § 86.877-7(a)(3)(i) starts when the preceding acceleration mode has been completed and ends when the engine speed is 50 r.p.m. below the rated speed and the provisions of § 86.877-7(a)(3)(i) are met.

(7) The lugging mode specified in § 86.877-7(a)(3)(ii) starts when the preceding transition period has been completed and ends when the engine speed is at the maximum torque speed or at 60 percent of the rated speed, whichever is higher.

(b) Determine if the test requirements of § 86.877-7 are met by applying the following modal criteria.

(1) Idle mode as specified in § 86.877-7(a)(1):

(i) Duration: 5 to 5.5 minutes.

(ii) Speed: Within specifications during the last four minutes of the mode.

(2) Acceleration mode as specified in § 86.877-7(a)(2)(i):

(i) Duration: 3 seconds or less.

(ii) Speed increase: 200±50 r.p.m.

(3) Acceleration mode as specified in § 86.877-7(a)(2)(ii):

(i) Linearity: ±100 r.p.m. as specified in paragraph (c) of this section.

(ii) Duration: 3.5 to 6.5 seconds.

(iii) Throttle position: Fully-open until speed is at least 85 percent of the rated speed.

(4) Transition period as specified in § 86.877-7(a)(2)(iii):

(i) Throttle position: Moved rapidly to, and held in the fully-closed position.

(5) Acceleration mode as specified in § 86.877-7(a)(2)(iv):

(i) Duration: 8 to 12 seconds.

(ii) Throttle position: Fully-open when speed is at maximum torque speed or at 60 percent of rated speed (within 50 r.p.m.), whichever is higher.

(6) Transition period as specified in § 86.877-7(a)(3)(i):

(i) Duration: 50 to 60 seconds.

(ii) Speed during last 10 seconds within ±50 r.p.m. of rated speed.

(iii) Corrected power during last 10 seconds: At least 95 percent of horsepower developed during zero-hour testing.

(7) Lugging mode as specified in § 86.877-7(a)(3)(ii):

(i) Linearity: ±100 r.p.m. as specified in paragraph (c) of this section.

(ii) Duration: 30 to 40 seconds.

(iii) Speed at end: Maximum torque speed or 60 percent of rated speed, whichever is higher.

(c) Determine if the linearity requirements of § 86.877-7 were met by means of the following procedure.

(1) For the acceleration mode specified in § 86.877-7(a)(2)(ii), note the maximum deflection of the r.p.m. trace from a straight line drawn between the starting and ending points specified in paragraph (a)(3) of this section.

(2) For the lugging mode specified in § 86.877-7(a)(3)(ii), note the maximum deflection of the r.p.m. trace from a straight line drawn from the starting and ending points specified in paragraph (a)(7) of this section.

(3) The test results will be invalid if any deflection is greater than 100 r.p.m.

(d) Analyze the smoke trace by means of the following procedure.

(1) Starting at the beginning of the first acceleration, as defined in paragraph (a)(2) of this section, and stopping at the end of the second acceleration, as defined in paragraph (a)(3) of this section, divide the smoke trace into ½-second intervals. Similarly, subdivide into ½-second intervals the third acceleration mode and the lugging mode as defined by paragraphs (a)(5) and (7) of this section respectively, of this section.

(2) Determine the average smoke reading during each ½-second interval.

(3) Locate and record the 15 highest ½-second readings during the acceleration mode of each dynamometer cycle.

(4) Locate and record the five highest ½-second readings during the lugging mode of each dynamometer cycle.

(5) Examine the average ½-second values which were determined in paragraphs (d)(3) and (4) of this section and record the three highest values for each dynamometer cycle.

[40 FR 27593, June 30, 1975, as amended at 41 FR 29393, July 16, 1976]

§ 86.877-14 Calculations.

(a) Average the 45 readings in § 86.877-13(d)(3) and designate the value as "a".

(b) Average the 15 readings in § 86.877-13(d)(4) and designate the value as "b".

(c) Average the nine readings in § 86.877-13(d)(5) and designate the value as "c".

§ 86.879-5 Test procedures.

The procedures described in this and subsequent sections will be the test program to determine the conformity of engines with the standard set forth in § 86.079-11(a).

(a) The test consists of a prescribed sequence of engine operating conditions on an engine dynamometer with continuous examination of the exhaust gases. The test is applicable equally to controlled engines equipped

with means for preventing, controlling, or eliminating smoke emissions and to uncontrolled engines.

(b) The test is designed to determine the opacity of smoke in exhaust emissions during those engine operating conditions which tend to promote smoke from Diesel vehicles.

(c) The test procedure begins with a preconditioned engine which is then run through preloading and preconditioning operations. After an idling period, the engine is operated through acceleration and lugging modes during which smoke emission measurements are made to compare with the standards. The engine is then returned to the idle condition and the acceleration and lugging modes are repeated. Three consecutive sequences of acceleration and lugging constitutes the full set of operating conditions for smoke emission measurement.

(d) Except in cases of component malfunction or failure, all emission control systems installed on or incorporated in a new motor vehicle engine shall be functioning during all procedures in this subpart. Maintenance to correct component malfuntion or failure shall be authorized in accordance with § 86.079-24.

[42 FR 45171, Sept. 8, 1977]

§ 86.879-6 Diesel fuel specifications.

The requirements of this section are set forth in § 86.307.

[42 FR 45171, Sept. 8, 1977]

§ 86.879-7 Dynamometer operation cycle for smoke emission tests.

(a) The following sequence of operations shall be performed during engine dynamometer testing of smoke emissions, starting with the dynamometer preloading determined and the engine preconditioned (§ 86.879-12(c)).

(1) *Idle mode.* The engine is caused to idle for 5 to 5.5 minutes at the manufacturer's recommended curb-idle speed. The dynamometer controls shall be set to provide minimum load by turning the load switch to the "off" position or by adjusting the controls to the minimum load position.

(2) *Acceleration mode.* (i) The engine speed shall be increased to 200±50 rpm above the manufacturer's recommended curb-idle speed within 3 seconds.

(ii) Immediately upon completion of the mode specified in paragraph (a)(2)(i) of this section, the throttle shall be moved rapidly to, and held in, the fully-open position. The inertia of the engine and the dynamometer, or alternately a preselected dynamometer load, shall be used to control the acceleration of the engine so that the speed increases to 85 percent of the rated speed in 5±1.5 seconds. This acceleration shall be linear within 100 rpm as specified in § 86.879-13(c).

(iii) After the engine reaches the speed required in paragraph (a)(2)(ii) of this section, the throttle shall be moved rapidly to, and held in, the fully-closed position. Immediately after the throttle is closed, the preselected load required to perform the acceleration in paragraph (a)(2)(iv) of this section shall be applied.

(iv) When the engine decelerates to the intermediate speed (within 50 rpm), the throttle shall be moved rapidly to, and held in, the fully-open position. The preselected dynamometer load which was applied during the preceding transition period shall be used to control the acceleration of the engine so that the speed increases to at least 95 percent of the rated speed in 10±2 seconds.

(3) *Lugging mode.* (i) Immediately upon completion of the preceding acceleration mode, the dynamometer controls shall be adjusted to permit the engine to develop maximum horsepower at rated speed. This transition period shall be 50 to 60 seconds in duration. During the last 10 seconds of this period, the engine speed shall be maintained within 50 rpm of the rated speed, and the power (corrected, if neseccary, to rating conditions) shall be no less than 95 percent of the maximum horsepower developed at the zero-hour point.

(ii) With the throttle remaining in the fully-open position, the dynamometer controls shall be adjusted gradually so that the engine speed is reduced to the intermediate speed (within 50 rpm). This lugging operation shall be performed smoothly over a period of 35±5 seconds. The rate of slowing of the engine shall be

linear, within 100 rpm, as specified in § 86.879-13(c).

(4) *Engine unloading.* Immediately upon completion of the preceding lugging mode, the dynamometer and engine controls shall be returned to the idle position described in paragraph (a)(1) of this section. The engine must be at the curb-idle condition within one minute after completion of the lugging mode.

(b) The procedures described in paragraphs (a)(1) through (a)(4) of this section shall be repeated until 3 consecutive valid cycles have been completed. If 3 valid cycles have not been completed after a total of 6 consecutive cycles have been run, the engine shall be preconditioned by operation at maximum horsepower at rated speed for 10 minutes before the test sequence is repeated.

[42 FR 45171, Sept. 8, 1977]

§ 86.879-8 Dynamometer and engine equipment.

The following equipment shall be used for smoke emission testing of engines on engine dynamometers.

(a) An engine dynamometer with adequate characteristics to perform the test cycle described in § 86.879-7.

(b) An engine cooling system having sufficient capacity to maintain the engine at normal operating temperatures during conduct of the prescribed engine tests.

(c) A noninsulated exhaust system extending 15±5 feet from the exhaust manifold, or the crossover junction in the case of Vee engines, and presenting an exhaust back pressure within ±0.2 inch Hg of the upper limit at maximum rated horsepower, as established by the engine manufacturer in his sales and service literature for vehicle application. A conventional automotive muffler of a size and type commonly used with the engine being tested shall be employed in the exhaust system during smoke emission testing. The terminal 2 feet of the exhaust pipe shall be circular cross section and be free of elbows and bends. The end of the pipe shall be cut off squarely. The terminal 2 feet of the exhaust pipe shall have a nominal inside diameter in accordance with the engine being tested, as specified below:

Maximum rated horsepower	Exhaust pipe inside diameter	
Less than 101	inches	2
101-200	do	3
201-300	do	4
301 or more	do	5

(d) An engine air inlet system presenting an air inlet restriction within 1 inch of water of the upper limit for the engine operating condition which results in maximum air flow, as established by the engine manufacturer in his sales and service literature, for the engine being tested.

[42 FR 45172, Sept. 8, 1977]

§ 86.879-9 Smoke measurement system.

(a) *Schematic drawing.* The Figure I79-1 is a schematic drawing of the optical system of the light extinction meter.

(b) *Equipment.* The following equipment shall be used in the system:

(1) Adapter—the smokemeter optical unit may be mounted on a fixed or movable frame. The normal unrestricted shape of the exhaust plume shall not be modified by the adaptor, the meter, or any ventilator system used to remove the exhaust from the test site.

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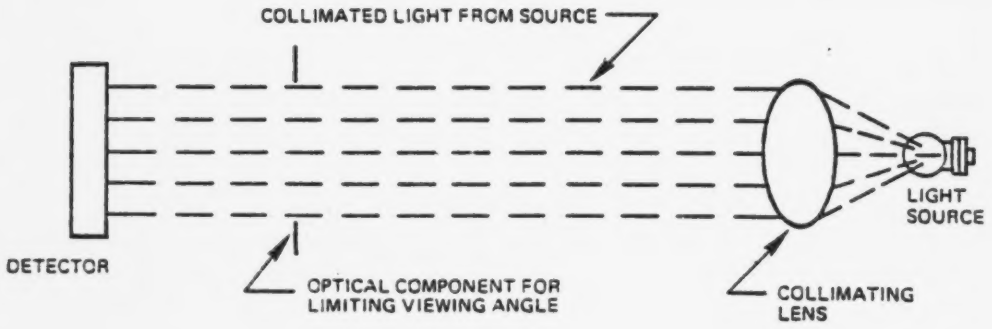

Figure I79-1 SMOKEMETER OPTICAL SYSTEM (SCHEMATIC)

(2) Smokemeter (light extinction meter)—continuous recording, full-flow light obscuration meter. It shall be positioned near the end of the exhaust pipe so that a built-in light beam traverses the exhaust smoke plume which issues from the pipe at right angles to the axis of the plume. The light source is an incandescent lamp operated at a constant voltage of not less than 15 percent of the manufacturer's specified voltage. The lamp output is collimated to a beam with a nominal diameter of 1.125 inches. The angle of divergence of the collimated beam shall be within 4° included angle. A light detector, directly opposed to the light source, measures the amount of light blocked by the smoke in the exhaust. The detector sensitivity is restricted to the visual range and comparable to that of the human eye. A collimating tube with apertures equal to the beam diameter is attached to the detector. It restricts the viewing angle of the detector to within 16° included angle. An amplified signal corresponding to the amount of light blocked is recorded continuously on a remote recorder. An air curtain across the light source and detector window assemblies may be used to minimize deposition of smoke particles on those surfaces provided that it does not measurably affect the opacity of the plume. The meter consists of two units, an optical unit and a remote control unit. Light extinction meters employing substantially identical measurement principles and producing substantially equivalent results but which employ other electronic and optical techniques may be used only after having been approved in advance by the Administrator.

(3) Recorder—a continuous recorder, with variable chart speed over a minimal range of 0.5 to 8.0 inch per minute (or equivalent) and an automatic marker indicating 1-second intervals shall be used for continuously recording the exhaust gas opacity, engine rpm and throttle position. The recorder shall be equipped to indicate only when the throttle is in the fully-open of fully-closed position. The recorder scale for opacity shall be linear and calibrated to read from 0 to 100 percent opacity full scale. The opacity trace shall have a resolution within 1-percent opacity. The recorder scale for engine rpm shall be linear and have a resolution of 30 rpm. The throttle position trace must clearly indicate when the throttle is in the fully-open and fully-closed positions. Any means other than a strip-chart recorder may be used provided it produces a permanent visual data record of quality equal to or better than that described above.

(4) The recorder used with the smoke-meter shall be capable of full-scale deflection in 0.5 second or less. The smokemeter-recorder combination may be damped so that signals with a frequency higher than 10 cycles per second are attenuated. A separate low-pass electronic filter with the follow-

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ing performance characteristics may be installed between the smokemeter and the recorder to achieve the high-frequency attenuation.

(i) 3 decibel point—10 cycles per second.

(ii) Insertion loss—zero ± 0.5 decibel.

(iii) Selectivity—12 decibels per octave above 10 cycles per second.

(iv) Attenuation—27 decibels down at 40 cycles per second minimum.

(c) *Assembling equipment.* (1) The optical unit of the smokemeter shall be mounted radially to the exhaust pipe so that the measurement will be made at right angles to the axis of the exhaust plume. The distance from the optical centerline to the exhaust pipe outlet shall be 5±1 inch. The full flow of the exhaust stream shall be centered between the source and detector apertures (or windows and lenses) and on the axis of the light beam.

(2) Power shall be supplied to the control unit of the smokemeter in time to allow at least 15 minutes for stabilization prior to testing.

[42 FR 45172, Sept. 8, 1977]

§ 86.879-10 Information.

The following information, as applicable, shall be recorded for each test:

(a) Engine description and specifications. A copy of the information specified in this paragraph must accompany each engine sent to the Administrator for compliance testing. If the engine is submitted to the Administrator for testing under Subpart D, only the information specified in § 86.337 need accompany the engine. The manufacturer need not record the information specified in this paragraph for each test if the information, with the exception of subparagraphs (3), (12), and (13) of this paragraph, is included in the manufacturer's Part I.

(1) Engine-system combination.

(2) Engine identification numbers.

(3) Number of hours of operation accumulated on engine.

(4) Rated maximum horsepower and torque.

(5) Maximum horsepower and torque speeds.

(6) Engine displacement.

(7) Governed speed.

(8) Curb-idle rpm.

(9) Fuel consumption at maximum power and torque.

(10) Maximum air flow.

(11) Air inlet restriction.

(12) Exhause pipe diameter(s).

(13) Maximum exhaust system back pressure.

(b) Test data; general. This information may be recorded at any time between 4 hours prior to the test and 4 hours after the test.

(1) Engine-system combination.

(2) Engine identification numbers.

(3) Instrument operator.

(4) Engine operator.

(5) Number of hours of operation accumulated on the engine prior to beginning the warm-up portion of the test.

(6) Calibration date(s) of neutral density filters used to calibrate the smokemeter.

(c) Test data; pre-test.

(1) Date and time of day.

(2) Test number.

(3) Barometric pressure.

(4) Smokemeter: Number-zero control setting—calibration control setting—gain.

(5) Intake air humidity and temperature:

(i) Humidity-conditioned air supply. Air that has had its absolute humidity altered is considered humidity-conditioned air. For this type of intake air supply, the humidity measurement must be made within the intake air supply system, and after the humidity conditioning has taken place.

(ii) Non-conditioned air supply. Humidity measurements in non-conditioned intake air supply systems must be made in the intake air stream entering the supply system and within 18 inches of the inlet for supply system. Alternatively, the humidity measurements can be measured within the intake air supply stream.

(iii) Engine intake air temperature measurement must be made within 48 inches of the engine. The measurement location must be made either in the supply system or in the air stream entering the supply system.

(d) Test data; modal.

(1) Observed engine torque and speed during the steady-state test conditions specified in § 86.879-7(a)(3)(i).

(2) Recorder chart: Identify zero traces—calibration traces—idle traces—closed-throttle trace—open-throttle trace—acceleration and lug-down test traces—start and finish of each test.

[42 FR 45173, Sept. 8, 1977]

§ 86.879–11 Instrument checks.

(a) The smokemeter shall be checked according to the following procedure prior to each test:

(1) The optical surfaces of the optical section shall be visually checked to verify that they are clean and free of foreign material and fingerprints;

(2) The zero control shall be adjusted under conditions of "no smoke" to give a recorder trace of zero;

(3) Calibrated neutral density filters having approximately 10, 20, and 40 percent opacity shall be employed to check the linearity of the instrument. The filter(s) shall be inserted in the light path perpendicular to the axis of the beam and adjacent to the opening from which the beam of light from the light source emanates, and the recorder response shall be noted. Filters with exposed filtering media shall be checked for opacity every 6 months; all other filters shall be checked every year, using NBS or equivalent reference filters. Deviations in excess of 1 percent of the nominal opacity shall be corrected.

(b) The instruments for measuring and recording engine rpm, engine torque, air inlet restrictions, exhaust system back pressure, throttle position, etc., which are used in the test prescribed herein, shall be calibrated in accordance with good engineering practice.

[42 FR 45173, Sept. 8, 1977, as amended at 46 FR 50496, Oct. 13, 1981]

§ 86.879–12 Test run.

(a) The temperature of the air supplied to the engine shall be between 68° F and 86° F. The fuel temperature at the pump inlet shall be 100° F ± 10° F. The observed barometric pressure shall be between 28.5 inches and 31 inches Hg. Higher air temperature or lower barometric pressure may be used, if desired, but no allowance will be made for possible increased smoke emissions because of such conditions.

(b) The governor and fuel system shall have been adjusted to provide engine performance at the levels in the application for certification required under § 86.079–21.

(c) The following steps shall be taken for each test:

(1) Start cooling system;

(2) Warm-up the engine by the procedure described in § 86.341(d)(5);

(3) Determine by experimentation the dynamometer inertia and dynamometer load required to perform the acceleration in the dynamometer cycle for smoke emission tests (§ 86.879–7(a)(2)). In a manner appropriate for the dynamometer and controls being used, arrange to conduct the acceleration mode;

(4) Install smokemeter optical unit and connect it to the recorder. Connect the engine rpm and throttle position sensing devices to the recorder;

(5) Turn on purge air to the optical unit of the smokemeter, if purge air is used;

(6) Check and record zero and span settings of the smokemeter recorder at a chart speed of approximately 1 inch per minute. (The optical unit shall be retracted from its position about the exhaust stream if the engine is left running.);

(7) Precondition the engine by operating it for 10 minutes at maximum rated horsepower;

(8) Proceed with the sequence of smoke emission measurements on the engine dynamometer as prescribed in § 86.879–7;

(9) During the test sequence of § 86.879–7, continuously record smoke measurements, engine rpm, and throttle position at a minimum chart speed of 1 inch per minute during the idle mode and transitional periods and 8 inches per minute during the acceleration and lugging modes. The smokemeter zero and full-scale recorder deflections may be rechecked during the idle mode of each test sequence. If either zero or full-scale drift is in excess of 2 percent opacity, the smokemeter controls must be readjusted and the test must be repeated;

(10) Turn off engine;

(11) Check zero and reset if necessary and check span of the smokemeter recorder by inserting neutral density filters. If either zero or span drift is in excess of 2 percent opacity, the test results shall be invalidated.

[42 FR 45173, Sept. 8, 1977]

§ 86.879-13 Chart reading.

The following procedure shall be used to analyze the recorder chart:

(a) Locate the modes specified in § 86.879-7 (a)(1) through (a)(4) by applying the following starting and ending criteria:

(1) The idle mode specified in § 86.879-7(a)(1) starts when engine preconditioning or the lugging mode of a preceding cycle has been completed and ends when the engine speed is raised above the idle speed.

(2) The acceleration mode specified in § 86.879-7(a)(2)(i) starts when the preceding idle mode has been completed and ends when the throttle is in the fully-open position as indicated by the throttle position trace.

(3) The acceleration mode specified in § 86.879-7(a)(2)(ii) starts when the preceding acceleration mode has been completed and ends when the engine speed reaches 85 percent of the rated speed.

(4) The transition period specified in § 86.879-7(a)(2)(iii) starts when the preceding acceleration mode has been completed and ends when the throttle is in the fully-open position as indicated by the throttle position trace.

(5) The acceleration mode specified in § 86.879-7(a)(2)(iv) starts when the preceding transition period has been completed and ends when the engine speed reaches 95 percent of the rated speed.

(6) The transition period specified in § 86.879-7(a)(3)(i) starts when the preceding acceleration mode has been completed and ends when the engine speed is 50 rpm below the rated speed and the provisions of § 86.879-7(a)(3)(i) are met.

(7) The lugging mode specified in § 86.879-7(a)(3)(ii) starts when the preceding transition period has been completed and ends when the engine speed is at the intermediate speed.

(b) Determine if the test requirements of § 86.879-7 are met by applying the following modal criteria:

(1) Idle mode as specified in § 86.879-7(a)(1):

(i) Duration: 5 to 5.5 minutes.

(ii) Speed: Within specifications during the last 4 minutes of the mode.

(2) Acceleration mode as specified in § 86.879-7(a)(2)(i).

(i) Duration: 3 seconds or less.

(ii) Speed increase: 200±50 rpm.

(3) Acceleration made as specified in § 86.879-7(a)(2)(ii):

(i) Linearity: ±100 rpm as specified in paragraph (c) of this section.

(ii) Duration: 3.5 to 6.5 seconds.

(iii) Throttle position: Fully-open until speed is at least 95 percent of the rated speed.

(4) Transition period as specified in § 86.879-7(a)(2)(iii):

(i) Throttle position: Moved rapidly to, and held in the fully-closed position.

(5) Acceleration mode as specified in § 86.879-7(a)(2)(iv):

(i) Duration: 8 to 12 seconds.

(ii) Throttle position: Fully-open when speed is at intermediate speed.

(6) Transition period as specified in § 86.879-7(a)(3)(i):

(i) Duration: 50 to 60 seconds.

(ii) Speed during last 10 seconds within ±50 rpm of rated speed.

(iii) Corrected power during last 10 seconds: At least 95 percent of horsepower developed during zero-hour testing.

(7) Lugging mode as specified in § 86.879-7(a)(3)(ii):

(i) Linearity: ±100 rpm as specified in paragraph (c) of this section.

(ii) Duration: 30 to 40 seconds.

(iii) Speed at end: Intermediate speed.

(c) Determine if the linearity requirements of § 86.879-7 were met by means of the following procedure:

(1) For the acceleration mode specified in § 86.879-7(a)(2)(ii), note the maximum deflection of the rpm trace from a straight line drawn between the starting and ending points specified in paragraph (a)(3) of this section.

(2) For the lugging mode specified in § 86.879-7(a)(3)(ii), note the maximum deflection of the rpm trace from a straight line drawn from the starting

and ending points specified in paragraph (a)(7) of this section.

(3) The test results will be invalid if any deflection is greater than 100 rpm.

(d) Analyze the smoke trace by means of the following procedure:

(1) Starting at the beginning of the first acceleration, as defined in paragraph (a)(2) of this section, and stopping at the end of the second acceleration, as defined in paragraph (a)(3) of this section, divide the smoke trace into ½-second intervals. Similarly, subdivide into ½-second intervals the third acceleration mode and the lugging mode as defined by paragraphs (a) (5) and (7) respectively, of this section.

(2) Determine the average smoke reading during each ½-second interval.

(3) Locate and record the 15 highest ½-second readings during the acceleration mode of each dynamometer cycle.

(4) Locate and record the five highest ½-second readings during the lugging mode of each dynamometer cycle.

(5) Examine the average ½-second values which were determined in subparagraphs (3) and (4) of this paragraph and record the 3 highest values for each dynamometer cycle.

[42 FR 45174, Sept. 8, 1977]

§ 86.879-14 Calculations.

(a) Average the 45 readings in § 86.879-13(d)(3) and designate the value as "A".

(b) Average the 15 readings in § 86.879-13(d)(4) and designate the value as "B".

(c) Average the 9 readings in § 86.879-13(d)(5) and designate the value as "C".

[42 FR 45174, Sept. 8, 1977]

Subpart K—Selective Enforcement Auditing of New Gasoline-Fueled and Diesel Heavy-Duty Engines and Light-Duty Trucks

SOURCE: 45 FR 63772, Sept. 25, 1980, unless otherwise noted.

§ 86.1001-84 Applicability.

The provisions of this subpart are applicable for 1984 and later model year gasoline-fueled land diesel heavy-duty engines and light-duty trucks.

§ 86.1002-84 Definitions.

(a) The definitions in this section apply to this subpart.

(b) As used in this subpart, all terms not defined herein have the meaning given them in the Act.

"Acceptable Quality Level" (AQL) means the maximum percentage of failing engines or vehicles that, for purposes of sampling inspection, can be considered satisfactory as a process average.

"Configuration" means a subclassification, if any, of a heavy-duty engine family for which a separate projected sales figure is listed in the manufacturer's Application for Certification and which can be described on the basis of emission control system, governed speed, injector size, engine calibration, and other parameters which may be designated by the Administrator, or a subclassification of a light-duty truck engine family-emission control system combination on the basis of engine code, inertia weight class, transmission type and gear ratios, rear axle ratio, and other parameters which may be designated by the Administrator.

"In the Hands of the Manufacturer" means that heavy-duty engines or light-duty trucks are still in the possession of the manufacturer and have not had their bills of lading transferred to another person for the purpose of transporting.

"Test Sample" means the collection of light-duty trucks or heavy-duty engines of the same configuration which have been selected to receive exhaust emission testing.

§ 86.1003-84 Test orders.

(a) The Administrator shall require any testing under this subpart by means of a test order addressed to the manufacturer.

(b) The test order will be signed by the Assistant Administrator for Enforcement or his designee. The test order will be delivered in person by an EPA Enforcement Officer to a company representative or sent by registered mail, return receipt requested, to the manufacturer's representative who signs the Application for Certification submitted by the manufacturer pursu-

ant to the requirements of the applicable sections of Subpart A of this part. Upon receipt of a test order, the manufacturer shall comply with all of the provisions of this subpart and instructions in the test order.

(c)(1) The test order will specify the engine or vehicle configuration selected for testing, the manufacturer's vehicle or engine assembly plant or associated storage facility from which the engines or vehicles must be selected, the time and the location at which engines or vehicles must be selected, and the procedure by which engines or vehicles of the specified configuration must be selected. The test order may include alternative configurations to be selected for testing in the event that engines or vehicles of the first specified configuration are not available for testing because those engines or vehicles are not being manufactured at the specified assembly plant, not being manufactured during the specified time, or not being stored at the specified assembly plant or associated storage facility. In addition, the test order may include other directions or information essential to the administration of the required testing.

(2) The following instructions are applicable to each test order issued under this subpart.

(i) The manufacturer shall make the following documents available to EPA Enforcement Officers upon request:

(A) A properly filed and current application for certification, following the format prescribed by the EPA for the appropriate model year; and

(B) A copy of the shop manual and dealer service bulletins for the configurations being tested.

(ii) Only one mechanic at a time per engine or vehicle shall make authorized checks, adjustment, or repair, unless a particular check, adjustment, or repair requires a second mechanic as indicated in the shop manual or dealer service bulletins.

(iii) A mechanic shall not perform any check, adjustment, or repair without an Enforcement Officer present unless otherwise authorized.

(iv) The manufacturer shall utilize only those tools and test equipment utilized by its dealers or those dealers using its engines when performing authorized checks, adjustments, or repairs.

(d) A manufacturer may submit a list of engine families and the corresponding assembly plants or associated storage facilities from which the manufacturer prefers to have engines or vehicles selected for testing in response to a test order. In order that a manufacturer's preferred location be considered for inclusion in a test order for a configuration of a particular engine family, the list must be submitted prior to issuance of the test order. Notwithstanding the fact that a manufacturer has submitted the above list, the Administrator may order selection at other than a preferred location.

(e) Upon receipt of a test order, a manufacturer shall proceed in accordance with the provisions of this subpart.

(f)(1) During a given model year, the Administrator shall not issue to a manufacturer more Selective Enforcement Auditing (SEA) test orders than an annual limit determined by the following:

(i) For manufacturers of heavy-duty engines, either gasoline-fueled or diesel, the number determined by dividing the projected heavy-duty engine sales bound for the United States market for that year, as made by the manufacturer in its Application for Certification, by 30,000 and rounding to the nearest whole number, unless the projected sales are less than 15,000, in which case the number is one;

(ii) For manufacturers of light-duty trucks, either gasoline-fuel or diesel, the number determined by dividing the projected light-duty truck sales bound for the United States market for that model year, as made by the manufacturer in its Application for Certification, by 300,000 and rounding to the nearest whole number, unless the projected sales are less than 150,000, in which case the number is one.

(2) Any SEA test order for which the configuration fails in accordance with § 86.1010-84 or for which testing is not completed will not be counted against the annual limit.

(3) When the annual limit has been met, the Administrator may issue ad-

ditional test orders for those configurations for which evidence exists indicating noncompliance. An SEA test order issued on this basis will include a statement as to the reason for its issuance.

§ 86.1004-84 Testing by the Administrator.

(a) The Administrator may require by test order that engines or vehicles of a specified configuration be selected in a manner consistent with the requirements of § 86.1007-84 and submitted to him at such place as he may designate for the purpose of conducting emission tests. These tests will be conducted in accordance with § 86.1008-84 of these regulations to determine whether engines or vehicles manufactured by the manufacturer conform with the regulations with respect to which the certificate of conformity was issued.

(b)(1) Whenever the Administrator conducts a test on a test engine or vehicle or the Administrator and manufacturer each conduct a test on the same test engine or vehicle, the results of the Administrator's test will comprise the official data for that engine or vehicle.

(2) Whenever the manufacturer conducts all tests on a test engine or vehicle, the manufacturer's test data will be accepted as the official data: *Provided*, That if the Administrator makes a determination based on testing under paragraph (a) of this section that there is a substantial lack of agreement between the manufacturer's test results and the Administrator's test results, no manufacturer's test data from the manufacturer's test facility will be accepted for purposes of this subpart.

(c) If testing conducted under paragraph (a) of this section demonstrates a lack of agreement under paragraph (b)(2) of this section, the Administrator shall—

(1) Notify the manufacturer in writing of his determination that the test facility is inappropriate for conducting the tests required by this subpart and the reasons therefor; and

(2) Reinstate any manufacturer's data upon a showing by the manufacturer that the data acquired under paragraph (a) of this section was erroneous and the manufacturer's data was correct.

(d) The manufacturer may request in writing that the Administrator reconsider his determination in paragraph (b)(2) of this section based on data or information which indicates that changes have been made to the test facility and these changes have resolved the reasons for disqualification.

§ 86.1005-84 Maintenance of records; submittal of information.

(a) The manufacturer of any new gasoline-fueled or diesel heavy-duty engine or light-duty truck subject to any of the provisions of this subpart shall establish, maintain, and retain the following adequately organized and indexed records:

(1) *General records.* A description of all equipment used to test engines or vehicles in accordance with § 86.1008-84 pursuant to a test order issued under this subpart, specifically—

(i) If testing heavy-duty gasoline engines, the equipment requirements specified in §§ 86.1306-84 and 86.1506-84 of this part;

(ii) If testing heavy-duty diesel engines, the equipment requirements specified in §§ 86.1306-84, 86.1506-84, 86.879-6, 86.879-8, and 86.879-9 of this part; [§ 86.306-79 for Subpart D testing only.]

(iii) If testing light-duty gasoline-fueled trucks, the equipment requirements specified in §§ 86.106 (excluding all references to evaporative and particulate emission testing) and 86.1506-84 of this part; and

(iv) If testing light-duty diesel trucks, the equipment requirements specified in § 86.106 (excluding all references to evaporative emission testing) of this part.

(2) *Individual records.* These records pertain to each audit conducted pursuant to this subpart.

(i) The date, time, and location of each test;

(ii) The number of hours of service accumulated on the engine or the number of miles on the vehicle when the test began and ended;

(iii) The names of all personnel, including supervisory personnel, involved in the conduct of the audit;

(iv) A record and description of any repairs performed prior to and/or subsequent to approval by the Administrator, giving the date and time of the repair, the reason for it, the person authorizing it, and the names of all personnel involved in the supervising and performance of the repair;

(v) The date when the engine or vehicle was shipped from the assembly plant or associated storage facility and when it was received at the testing facility;

(vi) A complete record of all emission tests performed pursuant to this subpart (except test performed by EPA directly), including all individual worksheets and/or other documentation relating to each test, or exact copies thereof, specifically—

(A) If testing heavy-duty gasoline engines, the record requirements specifed in §§ 86.1342-84 and 86.1542-84 of this part;

(B) If testing heavy-duty diesel engines, the record requirements specified in §§ 86.1342-84, 86.1542-84, and 86.879-10; (§ 86.337-79 for Subpart D testing only).

(C) If testing light-duty gasoline-fueled trucks, the record requirements specified in §§ 86.142 (excluding all references to diesel vehicles) and 86.1542-84; and

(D) If testing light-duty diesel trucks, the record requirements specified in § 86.142; and

(vii) A brief description of any significant audit events commencing with the test engine or vehicle selection process but not described by any subparagraph under paragraph (a)(2) of this section, including such extraordinary events as engine damage during shipment or vehicle accident.

(3) The manufacturer shall record test equipment description, pursuant to pargraph (a)(1) of this section, for each test cell that can be used to perform emission testing under this subpart.

(b) The manufacturer shall retain all records required to be maintained under this subpart for a period of one (1) year after completion of all testing in response to a test order. Records may be retained as hard copy or reduced to microfilm, punch cards, etc., depending upon the manufacturer's record retention procedure: *Provided*, That in every case all the information contained in the hard copy is retained.

(c) Heavy-duty engine or light-duty truck manufacturers shall submit to the Administrator on a quarterly basis no later than thirty days after the close of each calendar quarter or other reporting schedule as approved by the Administrator all emission data, whether or not from FTP testing, from testing of production engines or vehicles. The manufacturer shall provide the following information with respect to these engines or vehicles:

(1) Description of quality audit or other program under which production engines or vehicles are tested, including a description of sampling plans, method of sample selection, sampling rates, and emissions test employed.

(2) EPA engine family.

(3) Engine or vehicle indentification number.

(4) Configuration.

(5) Engine or vehicle model year and build date.

(6) Number of hours of service accumulated on engine or number of miles on vehicle prior to testing.

(7) Description of any preparation, maintenance, modification or repair on test engines or vehicles.

(8) Emission test results for each vaild test. If the above information is available on Automatic Data Processing (ADP) equipment, the manufacturer shall submit the information on an ADP storage device such as magnetic tape, magnetic disc, punched cards, etc. *Provided*, That the manufacturer's storage device is compatible with EPA's ADP equipment. EPA shall return ADP equipment submitted by the manufacturer or, upon a request by the manufacturer, furnish the necessary ADP storage devices. Information submitted once need not be submitted again if there are so subsequent changes.

(d) Pursuant to a request made by the Administrator, the manufacturer shall submit to him the following information with regard to engine or vehicle production:

(1) Number of engines or vehicles, by configuration and assembly plant,

scheduled for production for the time period designated in the request.

(2) Number of engines or vehicles, by configuration and assembly plan, produced during the time period designated in the request which are complete for introduction into commerce.

(e) Nothing in this section limits the Administrator's discretion in requiring the manufacturer to retain additional records or submit information not specifically required by this section.

(f) The manufacturer shall address all reports, submissions notifications, and requests for approvals made under this subpart to: Director, Manufacturers Operations Division, U.S. Environmental Protection Agency, EN-340, 401 M Street S.W., Washington, D.C. 20460.

§ 86.1006-84 Entry and access.

(a) To allow the Administrator to determine whether a manufacturer is complying with the provisions of this subpart and a test order issued thereunder, EPA Enforcement Officers are authorized to enter during operating hours and upon presentation of credentials any of the following:

(1) Any facility where any engine or vehicle to be introduced into commerce or any emission related component is manufactured, assembled, or stored;

(2) Any facility where any tests conducted pursuant to a test order or any procedures or activities connected with these tests are or were performed;

(3) Any facility where any engine or vehicle which is being tested, was tested, or will be tested is present; and

(4) Any facility where any record or other document relating to any of the above is located.

(b) Upon admission to any facility referred to in paragraph (a) of this section, EPA Enforcement Officers are authorized to perform the following inspection-related activities:

(1) To inspect and monitor any aspects of engine or vehicle manufacture, assembly, storage, testing and other procedures, and the facilities in which these procedures are conducted;

(2) To inspect and monitor any aspect of engine or vehicle test procedures or activities, including, but not limited to, monitoring engine or vehicle selection, preparation, service or mileage accumulation, preconditioning, emission test cycles, and maintenance; and to verify calibration of test equipment;

(3) To inspect and make copies of any records or documents related to the assembly, storage, selection and testing of an engine or vehicle in compliance with a test order; and

(4) To inspect and photograph any part or aspect of any engine or vehicle and any component used in the assembly thereof that is reasonably related to the purpose of the entry.

(c) EPA Enforcement Officers are authorized to obtain reasonable assistance without cost from those in charge of a facility to help them perform any function listed in this subpart and are authorized to request the recipient of a test order to make arrangements with those in charge of a facility operated for its benefit to furnish reasonable assistance without cost to EPA whether or not the recipient controls the facility.

(d) EPA Enforcement Officers are authorized to seek a warrant or court order authorizing the EPA Enforcement Officers to conduct activities related to entry and access as authorized in this section, as appropriate, to execute the functions specified in this section. EPA Enforcement Officers may proceed *ex parte* to obtain a warrant whether or not the Enforcement Officers first attempted to seek permission of the recipient of the test order or the party in charge of the facilities in question to conduct activities related to entry and access as authorized in this section.

(e) A recipient of a test order shall permit EPA Enforcement Officers who present a warrant or court order as described in paragraph (d) of this section to conduct activities related to entry and access as authorized in this section and as described in the warrant or court order. The recipient shall cause those in charge of its facility or a facility operated for its benefit to permit EPA Enforcement Officers to conduct activities related to entry and access as authorized in this section pursuant to a warrant or court order whether or not the recipient

controls the facility. In the absence of such a warrant or court order, EPA Enforcement Officers may conduct activities related to entry and access as authorized in this section only upon the consent of the recipient of the test order or the party in charge of the facilities in question.

(f) It is not a violation of this part or the Clean Air Act for any person to refuse to permit EPA Enforcement Officers to conduct activities related to entry and access as authorized in this section without a warrant or court order.

(g) A manufacturer is responsible for locating its foreign testing and manufacturing facilities in jurisdictions in which local foreign law does not prohibit EPA Enforcement Officers from conducting the entry and access activities specified in this section. EPA will not attempt to make any inspections which it has been informed that local foreign law prohibits.

(h) For purposes of this section, the following definitions are applicable:

(1) "Presentation of Credentials" means display of the document designating a person as an EPA Enforcement Officer.

(2) Where engine or vehicle storage areas or facilities are concerned, "operating hours" means all times during which personnel other than custodial personnel are at work in the vicinity of the area or facility and have access to it.

(3) Where facilities or areas other than those covered by paragraph (h)(2) of this section are concerned, "operating hours" means all times during which an assembly line is in operation, engine or vehicle assembly is taking place, testing, repair, service accumulation, preparation or compilation of records is taking place, or any other procedure or activity related to engine or vehicle manufacture, assembly or testing is being carried out in a facility.

(4) "Reasonable assistance" includes, but is not limited to, clerical, copying, interpreting and translating services, and the making available on an EPA Enforcement Officer's request of personnel of the facility being inspected during their working hours to inform the EPA Enforcement Officer of how the facility operates and to answer his or her questions. Any employee whom an EPA Enforcement Officer requests the manufacturer to cause to appear for questioning will be entitled to be accompanied, represented and advised by counsel.

§ 86.1007-81 Sample selection.

(a) Engines or vehicles comprising a test sample which are required to be tested, pursuant to a test order issued in accordance with this subpart, will be selected at the location and in the manner specified in the test order. If a manufacturer determines that the test engines or vehicles cannot be selected in the manner specified in the test order, an alternative selection procedure may be employed: *Provided*, That the manufacturer requests approval of the alternative procedure in advance of the start of test sample selection and that the Administrator approves the procedure.

(b) The manufacturer shall have assembled the test engines or vehicles of the configuration selected for testing using its normal mass production processes for engines or vehicles to be distributed into commerce. In the case of heavy-duty engines, if the test engines are selected at a location where they do not have their operational and emission control systems installed, the test order will specify the manner and location for selection of components to complete assembly of the engines. The manufacturer shall assemble these components onto the test engines using normal assembly and quality control procedures as documented by the manufacturer.

(c) No quality control, testing, or assembly procedures will be used on the completed test engine or vehicle or any portion thereof, including parts and subassemblies, that will not be used during the production and assembly of all other engines or vehicles of that configuration.

(d) The test order may specify that EPA Enforcement Officers, rather than the manufacturer, will select the test engines or vehicles according to the method specified in the test order.

(e) The order in which test engines or vehicles are selected determines the

order in which test results are to be used in applying the sampling plan in accordance with § 86.1010-84.

(f) The manufacturer shall keep on hand all untested engines or vehicles, if any, comprising the test sample until such time as a pass or fail decision is reached in accordance with § 86.1010-84(d). The manufacturer may ship any tested engine or vehicle which has not failed in accordance with § 86.1010-84(b). However, once the manufacturer ships any test engine or vehicle, it relinquishes the prerogative to conduct retests as provided in § 86.1008-84(i).

§ 86.1008-84 Test procedures.

(a)(1) For heavy-duty engines, the prescribed test procedure is the Federal Test Procedure as described in Subparts N, I, and P of this part.

(2) If a heavy-duty diesel engine manufacturer uses the test procedure in Subpart D of this part to certify 1984 model year engines pursuant to § 86.084-11 (a)(1)(i)(B), (a)(1)(ii)(B), (a)(1)(iii)(B), and (a)(2), that manufacturer shall use the test procedure in Subpart D when conducting emission tests on those engines pursuant to this subpart.

(3) For light-duty trucks, the prescribed test procedure is the Federal Test Procedure as described in Subparts B and P of this part. The manufacturer shall not perform the evaporative emission test procedure contained in Subpart B.

(4) When testing light-duty trucks the following exceptions to the test procedures in Subpart B are applicable:

(i) The manufacturer may use gasoline test fuel meeting the specifications of paragraph (a) of § 86.113 for mileage accumulation. Otherwise, the manufacturer may use fuels other than those specified in this section only with advance approval of the Administrator.

(ii) The manufacturer may measure the temperature of the test fuel at other than the approximate mid-volume of the fuel tank, as specified in paragraph (a) of § 86.131, and may drain the test fuel from other than the lowest point of the fuel tank, as specified in paragraph (b) of § 86.131, with the advance approval of the Administrator.

(iii) The manufacturer may perform additional preconditioning on SEA test vehicles other than the preconditioning specified in § 86.132 only if the additional preconditioning had been performed on certification test vehicles of the same configuration.

(iv) The manufacturer shall perform the heat build procedure 11 to 34 hours following vehicle preconditioning rather than according to the time period specified in paragraph (a) of § 86.133. All references in § 86.133 to an evaporative emission enclosure (SHED) and analyzing for HC during the heat build can be ignored.

(v) The manufacturer may substitute slave tires for the drive wheel tires on the vehicle as specified in paragraph (e) of § 86.135: *Provided,* That the slave tires are the same size.

(vi) The cold start exhaust emission test described in § 86.137 shall follow the heat build procedure described in § 86.133 by not more than one hour.

(vii) In performing exhaust sample analysis under § 86.140,

(A) When testing diesel vehicles, the manufacturer shall allow a minimum of 20 minutes warm-up for the HC analyzer, and a minimum of 2 hours warm-up for the CO, CO_2 and NO_x analyzers. [Power is normally left on infrared and chemiluminescent analyzers. When not in use, the chopper motors of the infrared analyzers are turned off and the phototube high voltage supply to the chemiluminescent analyzers is placed in the standby position.]

(B) The manufacturer shall exercise care to prevent moisture from condensing in the sample collection bags.

(viii) The manufacturer need not comply with § 86.142, since the records required therein are provided under other provisions of Subpart K of this part.

(ix) In addition to the requirements of Subpart B of this part, the manufacturer shall prepare gasoline-fueled vehicles as follows prior to exhaust emission testing:

(A) The manufacturer shall inspect the fuel system to insure the absence of any leaks of liquid or vapor to the atmosphere by applying a pressure of

14.5 ± 0.5 inches of water to the fuel system, allowing the pressure to stabilize, and isolating the fuel system from the pressure source. Following isolation of the fuel system, pressure must not drop more than 2.0 inches of water in 5 minutes. If required the manufacturer shall perform corrective action in accordance with paragraph § 86.1008(d) and report this action in accordance with paragraph § 86.1009(d).

(B) When performing this pressure check, the manufacturer shall exercise care to neither purge nor load the evaporative emission control system.

(C) The manufacturer shall not modify the test vehicle's evaporative emission control system by component addition, deletion, or substitution, except to comply with paragraph (a)(4)(ii) of this section if approved in advance by the Administrator.

(b)(1) The manufacturer shall not adjust, repair, prepare, or modify the engines or vehicles selected for testing and shall not perform any emission tests on engines or vehicles selected for testing pursuant to the test order unless this adjustment, repair, preparation, modification, and/or tests are documented in the manufacturer's engine or vehicle assembly and inspection procedures and are actually performed or unless these adjustments and/or tests are required or permitted under this subpart or are approved in advance by the Administrator.

(2) For 1984 and later model years the Administrator may adjust or cause to be adjusted any engine parameter which the Administrator has determined to be subject to adjustment for certification and Selective Enforcement Audit testing in accordance with § 86.084-22(e)(1), to any setting within the physically adjustable range of that parameter, as determined by the Administrator in accordance with § 86.084-22(e)(3)(ii), prior to the performance of any tests. However, if the idle speed parameter is one which the Administrator has determined to be subject to adjustment, the Administrator shall not adjust it to any setting which causes a lower engine idle speed then would have been possible within the physically adjustable range of the idle speed parameter if the manufacturer had accumulated 125 hours of service on the engine or 4,000 miles on the vehicle under paragraph (c) of this section, all other parameters being identically adjusted for the purpose of the comparison. The Administrator, in making or specifying these adjustments, may consider the effect of the deviation from the manufacturer's recommended setting on emissions performance characteristics as well as the likelihood that similar settings will occur on in-use heavy-duty engines or light-duty trucks. In determining likelihood, the Administrator may consider factors such as, but not limited to, the effect of the adjustment on engine or vehicle performance characteristics and surveillance information from similar in-use engines or vehicles.

(c) The manufacturer may accumulate up to 125 hours of service on each engine or 4,000 miles on each vehicle prior to performing exhaust emission testing. Service or mileage accumulation may be performed in any manner the manufacturer desires.

(1) The manufacturer shall accumulate service at a minimum rate of 16 hours or mileage at a minimum rate of 300 miles during each 24-hour period, unless otherwise provided by the Administrator.

(2) Service or mileage accumulation shall be performed on a sufficient number of test engines or vehicles during each 24-hour period to assure that the number of engines or vehicles tested per day fulfills the requirements of paragraph (g) of this section.

(d) No maintenance shall be performed on test engines or vehicles after selection for testing nor will any test engine or vehicle substitution or replacement be allowed, unless requested of the Administrator in advance of the performance of any maintenance or engine or vehicle substitution.

(e) The manufacturer shall expeditiously ship test engines or vehicles from the point of selection to the test facility. If the test facility is not located at or in close proximity to the point of selection, the manufacturer shall assure that test engines or vehicles arrive at the test facility within 24 hours of selection: *Except*, That the Administrator may approve more time

based upon a request by the manufacturer accompanied by a satisfactory justification.

(f) If an engine or vehicle can not complete the service or mileage accumulation or emission tests because of engine or vehicle malfunction, the manufacturer may request that the Administrator authorize the repair or replacement of the engine or vehicle. Any replacement engines or vehicles will be selected in a manner prescribed in the test order.

(g) Within one working day of receipt of the test order, the manufacturer shall notify the Administrator which test facility will be used to comply with the test order. If no test cells are available at a desired facility, the manufacturer must provide alternate testing capability satisfactory to the Administrator.

(1) Heavy-duty engine manufacturers with projected sales bound for the United States market for that year of 30,000 or greater, as made in their respective Applications for Certification, shall complete emission testing at their testing facility on a minimum of two engines per 24 hour period, including voided tests.

(2) Heavy-duty engine manufacturers with projected sales bound for the United States market for that year of less than 30,000, as made in their respective Applications for Certification, shall complete emission testing at their testing facility on a minimum of one engine per 24 hour period, including voided tests.

(3) Light-duty truck manufacturers shall complete emission testing on a minimum of four vehicles per 24-hour period, including voided tests.

(4) The Administrator may approve a longer period of time for conducting emission tests based upon a request by a manufacturer accompanied by a satisfactory justification.

(h) The manufacturer shall perform test engine or vehicle selection, shipping, preparation, service or mileage accumulation, and testing in such a manner as to assure that the audit is performed in an expeditious manner.

(i) The manufacturer may retest any engines or vehicles tested during a Selective Enforcement Audit once a fail decision for the audit has been reached in accordance with § 86.1010-84(d) based on the first test on each engine or vehicle: *Except,* That the Administrator may approve retesting at other times based upon a request by the manufacturer accompanied by a satisfactory justification. The manufacturer may test each engine or vehicle a total of three times. The manufacturer shall test each engine or vehicle the same number of times. The manufacturer may accumulate additional service or mileage before conducting a retest, subject to the provisions of paragraph (c) of this section.

§ 86.1009-84 Calculation and reporting of test results.

(a) Initial test results are calculated following the Federal Test Procedure specified in paragraph (a) of § 86.1008-84.

(b) Final test results are calculated by summing the initial test results derived in paragraph (a) of this section for each test engine or vehicle, dividing by the number of test conducted on the engine or vehicle, and rounding in accordance with ASTM E29-67 to the same number of decimal places contained in the applicable standard expressed to one additional significant figure.

(c) *Final deteriorated test results.* (1) The final deteriorated test results for each heavy-duty engine or light-duty truck tested according to Subpart B, D, N, or P of this part are calculated by multiplying the final test results by the appropriate deterioration factor, derived from the certification process for the engine family-control system combination and model year for the selected configuration to which the test engine or vehicle belongs. If the deterioration factor computed during the certification process is less than one, that deterioration factor will be one.

(2) The final deteriorated test results for each heavy-duty engine tested according to Subpart I of this part are calculated by adding the appropriate deterioration factor, derived from the certification process for the engine family-control system combination and model year for the selected configuration to which the test engine

belongs, to the final test results. If the deterioration factor computed during the certification process is less than zero, that deterioration factor will be zero.

(3) The final deteriorated test results are rounded to the same number of significant figures contained in the applicable standard in accordance with ASTM E29-67.

(d) Within five working days after completion of testing of all engines or vehicles pursuant to a test order, the manufacturer shall submit to the Administrator a report which includes the following information:

(1) The location and description of the manufacturer's exhaust emission test facilities which were utilized to conduct testing reported pursuant to this section;

(2) The applicable standards against which the engines or vehicles were tested;

(3) Deterioration factors for the engine family to which the selected configuration belongs;

(4) A description of the engine or vehicle and any emission-related component selection method used;

(5) For each test conducted,

(i) Test engine or vehicle description, including:

(A) Configuration and engine family identification,

(B) Year, make and build date,

(C) Engine or vehicle identification number, and

(D) Number of hours of service accumulated on engine or number of miles on vehicle prior to testing;

(ii) Location where service or mileage accumulation was conducted and description of accumulation procedure and schedule;

(iii) Test number, date, initial test results before and after rounding, final test results and final deteriorated test results for all exhaust emission tests, whether valid or invalid, and the reason for invalidation, if applicable;

(iv) A complete description of any modification, repair, preparation, maintenance, and/or testing which was performed on the test engine or vehicle and has not been reported pursuant to any other paragraph of this subpart and will not be performed on all other production engines or vehicles;

(v) Where a replacement engine or vehicle was authorized by the Administrator, the reason for the replacement and the information in (d)(5)(iii) of this section, if any, for the replacement engine or vehicle; and

(vi) Any other information the Administrator may request relevant to the determination as to whether the new heavy-duty engines or light-duty trucks being manufactured by the manufacturer do in fact conform with the regulations with respect to which the certificate of conformity was issued; and

(6)(i) For light-duty trucks the following statement and endorsement: This report is submitted pursuant to section 206 and section 208 of the Clean Air Act. This Selective Enforcement Audit was conducted in complete conformance with all applicable regulations under 40 CFR Part 86 et seq., and the conditions of the test order. All data and information reported herein is, to the best of

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(Company name)

knowledge, true and accurate. I am aware of the penalties associated with violations of the Clean Air Act and the regulations thereunder.

(Authorized Company Representative)

(ii) For heavy-duty engines the following statement and endorsement: This report is submitted pursuant to section 206 and section 208 of the Clean Air Act. All testing for which data is reported herein was conducted in strict conformance with applicable regulations under 40 CFR Part 86 et seq. All the data reported herein is a true and accurate representation of such testing. All other information reported herein is to the best of

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(Company name)

knowledge, true and accurate. I am aware of the penalties associated with violations of the Clean Air Act and the regulations thereunder.

(Authorized company representative)

§ 86.1010-84 Compliance with acceptable quality level and passing and failing criteria for Selective Enforcement Audits.

(a) The prescribed acceptable quality level is 10 percent.

(b) A failed engine or vehicle is one whose final deteriorated test results pursuant to paragraph 86.1009-84(c), for one or more of the applicable exhaust pollutants, exceed the applicable emission standard.

(c) The manufacturer shall test heavy-duty engines or light-duty trucks comprising the test sample until a pass decision is reached for all pollutants, or a fail decision is reached for one pollutant. A pass decision is reached when the cumulative number of failed engines or vehicles, as defined in paragraph (b) of this section, for each pollutant is less than or equal to the pass decision number appropriate to the cumulative number of engines or vehicles tested. A fail decision is reached when the cumulative number of failed engines or vehicles for one or more pollutants is greater than or equal to the fail decision number appropriate to the cumulative number of engines or vehicles tested. The pass and fail decision numbers associated with the cumulative number of engines or vehicles tested are determined by use of the tables in Appendix X of this part appropriate for the annual projected sales as made by the manufacturer in its Application for Certification. In the Tables in Appendix X, sampling plan "stage" refers to the cumulative number of engines or vehicles tested. Once a pass or fail decision has been made for a particular pollutant, the number of engines or vehicles whose final deteriorated test results exceed the emission standard for that pollutant shall not be considered any further for the purposes of the audit.

(d) Passing or failing of an SEA audit occurs when the decision is made on the last engine or vehicle required to make a decision under paragraph (c) of this section.

(e) The Administrator may terminate testing earlier than required in paragraph (c) of this section.

§ 86.1011-84 [Reserved]

§ 86.1012-84 Suspension and revocation of certificates of conformity.

(a) The certificate of conformity is suspended with respect to any engine or vehicle failing pursuant to paragraph (b) of § 86.1010-84 effective from the time that testing of that engine or vehicle is completed.

(b) The Administrator may suspend the certificate of conformity for a configuration which does not pass an SEA, pursuant to paragraph § 86.1010-84(c), based on the first test or all tests conducted on each engine or vehicle. This suspension will not occur before ten days after failure to pass the audit.

(c)-(d) [Reserved]

(e) If the results of testing pursuant to these regulations indicate that engines or vehicles of a particular configuration produced at one plant of a manufacturer do not conform to the regulations with respect to which the certificate of conformity was issued, the Administrator may suspend the certificate of conformity with respect to that configuration for engines or vehicles manufactured by the manufacturer at all other plants.

(f) [Reserved]

(g) The Administrator shall notify the manufacturer in writing of any suspension or revocation of a certificate of conformity in whole or in part: *Except*, That the certificate is immediately suspended with respect to any failed engines or vehicles as provided for in paragraph (a) of this section.

(h) The Administrator may revoke a certificate of conformity for a configuration when the certificate has been suspended pursuant to paragraph (b), (c) or (e) of this section if the proposed remedy for the nonconformity, as reported by the manufacturer to the Administrator, is one requiring a design change or changes to the engine and/or emission control system as described in the Application for Certification of the affected configuration.

(i) Once a certificate has been suspended for a failed engine or vehicle as provided for in paragraph (a) of

this section, the manufacturer shall take the following actions:

(1) Before the certificate is reinstated for that failed engine or vehicle,

(i) Remedy the nonconformity, and

(ii) Demonstrate that the engine or vehicle conforms to the applicable standards by retesting the engine or vehicle in accordance with these regulations; and

(2) Submit a written report to the Administrator within five working days after successful completion of testing on the failed engine or vehicle, which contains a description of the remedy and test results for each engine or vehicle in addition to other information that may be required by this regulation.

(j) Once a certificate for a failed configuration has been suspended pursuant to paragraph (b), (c) or (e) of this section, the manufacturer shall take the following actions before the Administrator will consider reinstating the certificate:

(1) Submit a written report to the Administrator which identifies the reason for the noncompliance of the engines or vehicles, describes the proposed remedy, including a description of any proposed quality control and/or quality assurance measures to be taken by the manufacturer to prevent future occurrences of the problem, and states the date on which the remedies will be implemented; and

(2) Demonstrate that the engine or vehicle configuration for which the certificate of conformity has been suspended does in fact comply with these regulations by testing engines or vehicles selected from normal production runs of that engine or vehicle configuration, at the plant(s) or associated storage facilities specified by the Administrator, in accordance with the conditions specified in the initial test order; *Except*, That if the manufacturer elects to continue testing individual engines or vehicles after suspension of a certificate, the certificate is reinstated for any engine or vehicle actually determined to be in conformance with the applicable standards through testing in accordance with the applicable test procedures: *Provided*, That the Administrator has not revoked the certificate pursuant to paragraph (h) of this section.

(k) Once the certificate has been revoked for a configuration and the manufacturer desires to continue introduction into commerce of a modified version of that configuration, the following actions shall be taken before the Administrator may consider issuing a certificate for that modified configuration:

(1) If the Administrator determines that the proposed change or changes in engine or vehicle design may have an effect on emission performance deterioration, he shall notify the manufacturer, within five (5) working days after receipt of the report in paragraph (h) of this section, whether subsequent testing under this subpart will be sufficient to evaluate the proposed change or changes or whether additional testing will be required; and

(2) After implementing the change or changes intended to remedy the nonconformity, the manufacturer shall demonstrate that the modified engine or vehicle configuration does in fact conform with these regulations by testing engines or vehicles selected from normal production runs of that modified engine or vehicle configuration in accordance with the conditions specified in the initial test order. This testing will be considered by the Administrator to satisfy the testing requirements of § 86.078-32 or § 86.079-33 if the Administrator had so notified the manufacturer. If the subsequent audit results in passing of the audit at the level of the standards, the Administrator shall reissue or amend the certificate, as the case may be, to include that configuration: *Provided*, That the manufacturer has satisfied the testing requirements specified pursuant to paragraph (j)(2) of this section. If the subsequent audit is failed, the revocation remains in effect. Any design change approvals under this subpart are limited to the configuration affected by the test order.

(l) At any time subsequent to an initial suspension of a certificate of conformity for a test engine or vehicle pursuant to paragraph (a) of this section, but not later than fifteen (15) days or such other period as may be allowed by the Administrator after no-

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tification of the Administrator's decision to suspend or revoke a certificate of conformity in whole or in part pursuant to paragraphs (b), (c), (d), (e), or (h) of this section, a manufacturer may request a hearing as to whether the tests have been properly conducted or any sampling methods have been properly applied.

(m) After the Administrator suspends or revokes a certificate of conformity pursuant to this section or notifies a manufacturer of his intent to suspend, revoke or void a certificate of conformity under paragraph § 86.084-30(e), and prior to the commencement of a hearing under § 86.1014-84, if the manufacturer demonstrates to the Administrator's satisfaction that the decision to suspend, revoke or void the certificate was based on erroneous information, the Administrator shall reinstate the certificate.

(n) To permit a manufacturer to avoid storing non-test engines or vehicles when conducting an audit of a configuration subsequent to suspension or revocation of the certificate of conformity for that configuration resulting from failure of an SEA, it may request that the Administrator conditionally reinstate the certificate for that configuration. The Administrator may reinstate the certificate subject to the condition that the manufacturer consents to recall all engines or vehicles of that configuration produced from the time the certificate is conditionally reinstated if the configuration fails the subsequent audit at the level of the standard and to remedy any nonconformity at no expense to the owner.

§ 86.1013-84 [Reserved]

§ 86.1014-84 Hearings on suspension, revocation and voiding of certificate of conformity.

(a) *Applicability.* The procedures prescribed by this section apply whenever a manufacturer requests a hearing pursuant to § 86.084-30(e)(6)(i), § 86.084-30(e)(7), or § 86.1012-84(l).

(b) *Definitions.* The following definitions are applicable to this section:

(1) "Hearing Clerk" shall mean the Hearing Clerk of the Environmental Protection Agency.

(2) "Manufacturer" means a manufacturer contesting a suspension or revocation order directed at the manufacturer.

(3) "Party" means the Agency and the manufacturer.

(4) "Presiding Officer" means an Administrative Law Judge appointed pursuant to 5 U.S.C. 3105 (see also 5 CFR Part 930 as amended).

(5) "Judicial Officer" means an officer or employee of the Agency appointed as a Judicial Officer by the Administrator pursuant to this section who shall meet the qualifications and perform functions as follows:

(i) Officer—there may be designated for the purposes of this section one or more Judicial Officers. As work requires, there may be a Judicial Officer designated to act for the purposes of a particular case.

(ii) Qualifications—a Judicial Officer may be a permanent or temporary employee of the Agency who performs other duties for the Agency. The Judicial Officer shall not be employed by the Office of Enforcement or have any connection with the preparation or presentation of evidence for a hearing held pursuant to this subpart. The Judicial Officer shall be a graduate of an accredited law school and a member in good standing of a recognized Bar Association of any state or the District of Columbia.

(iii) Functions—the Administrator may consult with Judicial Officer or delegate all or part of his authority to act in a given case under this section to a Judicial Officer: *Provided*, that this delegation does not preclude the Judicial Officer from referring any motion or case to the Administrator when the Judicial Officer determines such referral to be appropriate.

(c) *Request for public hearing.* (1) If the manufacturer disagrees with the Administrator's decision to suspend, revoke or void a certificate or disputes the basis for an automatic suspension pursuant to § 86.1012-84(a), the manufacturer may request a public hearing as described in this section. The manufacturer shall file with the Administrator a request for this hearing not later than fifteen (15) days after the Administrator's notification of his decision to suspend or revoke unless oth-

erwise specified by the Administrator. The manufacturer shall simultaneously serve two copies of this request upon the Director of the Manufacturers Operations Division and file two copies with the Hearing Clerk. Failure of the manufacturer to request a hearing within the time provided constitutes a waiver of the right to a hearing. Subsequent to the expiration of the period for requesting a hearing as of right, the Administrator may, in his discretion and for good cause shown, grant the manufacturer a hearing to contest the suspension or revocation.

(2) A manufacturer shall include in the request for a public hearing——

(i) A statement as to which engine or vehicle configuration is to be the subject of the hearing;

(ii) A concise statement of the issues to be raised by the manufacturer at the hearing: *Provided, however,* that in the case of the hearing requested under § 86.1012-84(1), the hearing is restricted to the following issues:

(A) Whether tests have been properly conducted, specifically, Whether the tests were conducted in accordance with applicable regulations under this part and whether test equipment was properly calibrated and functioning; and

(B) Whether sampling plans have been properly applied, specifically, whether sampling procedures specified in Appendix X were followed and whether there exists a basis for distinguishing engines or vehicles produced at plants other than the one from which engines or vehicles were selected for testing which would invalidate the Administrator's decision under § 86.1012-84(e);

(iii) A statement specifying reasons why the manufacturer believes it will prevail on the merits of each of the issues raised; and

(iv) A summary of the evidence which supports the manufacturer's position on each of the issues raised.

(3) A copy of all requests for public hearings will be kept on file in the Office of the Hearing Clerk and will be made available to the public during Agency business hours.

(d) *Summary decision.* (1) In the case of a hearing requested under § 86.1012-84(1), when it clearly appears from the data and other information contained in the request for a hearing that there is no genuine and substantial question of fact with respect to the issues specified in § 86.1014-84(c)(2)(ii), the Administrator shall enter an order denying the request for a hearing and reaffirming the original decision to suspend or revoke a certificate of conformity, if this decision has been made pursuant to § 86.1012-84(g) at any time prior to the decision to deny the request for a hearing.

(2) In the case of a hearing requested under § 86.084-30(e)(6)(i), to challenge a proposed suspension of a certificate of conformity for the reasons specified in § 86.084-30 (e)(1)(i) or (e)(1)(ii), when it clearly appears from the data and other information contained in the request for a hearing that there is no genuine and substantial question of fact with respect to the issue of whether the refusal to comply with the provisions of a test order or any other requirement of § 86.1003-84 was caused by conditions and circumstances outside the control of the manufacturer, the Administrator shall enter an order denying the request for a hearing and suspending the certificate of conformity.

(3) Any order issued under paragraphs (d)(1) or (d)(2) of this section has the force and effect of a final decision of the Administrator, as issued pursuant to paragraph (w)(4) of this section.

(4) If the Administrator determines that a genuine and substantial question of fact does exist with respect to any of the issues referred to in paragraphs (d)(1) and (d)(2) of this section, he shall grant the request for a hearing and publish a notice of public hearing in accordance with paragraph (h) of this section.

(e) *Filing and service.* (1) An original and two copies of all documents or papers required or permitted to be filed pursuant to this section must be filed with the Hearing Clerk. Filing is considered timely if mailed, as determined by the postmark, to the Hearing Clerk within the time allowed by this section. If filing is to be accomplished by mailing, the documents must be sent to the address set forth

in the notice of public hearing as described in paragraph (h) of this section.

(2) To the maximum extent possible, testimony will be presented in written form. Copies of written testimony will be served upon all parties as soon as practicable prior to the start of the hearing. A certificate of service will be provided on or accompany each document or paper filed with the Hearing Clerk. Documents to be served upon the Director of the Manufacturers Operations Division must be sent by registered mail to:

Director, Manufacturers Operations Division, U.S. Environmental Protection Agency, EN-340, 401 M Street S.W., Washington, D.C. 20460.

Service by registered mail is complete upon mailing.

(f) *Time.* (1) In computing any period of time prescribed or allowed by this section, except as otherwise provided, the day of the act or event from which the designated period of time begins to run is not included. Saturdays, Sundays, and Federal legal holidays are included in computing the period allowed for the filing of any document or paper, except that when the period expires on a Saturday, Sunday, or Federal legal holiday, the period is extended to include the next following business day.

(2) A prescribed period of time within which a party is required or permitted to do an act is computed from the time of service, except that when service is accomplished by mail, three days will be added to the prescribed period.

(g) *Consolidation.* The Administrator or the Presiding Officer in his discretion may consolidate two or more proceedings to be held under this section for the purpose of resolving one or more issues whenever it appears that consolidation will expedite or simplify consideration of these issues. Consolidation does not affect the right of any party to raise issues that could have been raised if consolidation had not occurred.

(h) *Notice of public hearings.* Notice of a public hearing under this section is given by publication in the FEDERAL REGISTER and by such other means as the Administrator finds appropriate to provide notice to the public. To the extent possible hearings under this section will be scheduled to commence within fourteen (14) days of receipt of the application in paragraph (c) of this section.

(i) *Amicus curiae.* Persons not parties to the proceeding wishing to file briefs may do so by leave of the Presiding Officer granted on motion. A motion for leave must identify the interest of the applicant and state the reasons why the proposed amicus brief is desirable.

(j) *Presiding Officer.* The Presiding Officer shall conduct a fair and impartial hearing in accordance with 5 U.S.C. sections 554, 556 and 557 and take all necessary action to avoid delay in the disposition of the proceedings and to maintain order. He shall have all power consistent with Agency rule and with the Administrative Procedure Act necessary to this end, including the power—

(1) To administer oaths and affirmations;

(2) To rule upon offers of proof and exclude irrelevant or repetitious material;

(3) To regulate the course of the hearings and the conduct of the parties and their counsel therein;

(4) To hold conferences for simplification of the issues or any other proper purpose;

(5) To consider and rule upon all procedural and other motions appropriate to these proceedings;

(6) To require the submission of direct testimony in written form with or without affidavit whenever, in his opinion, oral testimony is not necessary for full and true disclosure of the facts;

(7) To enforce agreements and orders requiring access as authorized by law;

(8) To require the filing of briefs on any matter on which he is required to rule;

(9) To require any party or any witness, during the course of the hearing, to state his position on any issue;

(10) To take or cause depositions to be taken whenever the ends of justice would be served thereby;

(11) To make decisions or recommend decisions to resolve the disputed

issues on the record of the hearing; and

(12) To issue, upon good cause shown, protective orders as described in paragraph (n) of this section.

(k) *Conferences.* (1) The Presiding Officer may hold conferences prior to or during any hearing. The Presiding Officer shall direct the Hearing Clerk to notify all parties of the time and location of any conference. At the discretion of the Presiding Officer, persons other than parties may attend. At a conference the Presiding Officer may—

(i) Obtain stipulations and admissions, receive requests, order depositions to be taken, identify disputed issues of fact and law, and require or allow the submission of written testimony from any witness or party;

(ii) Set a hearing schedule for as many of the following as he considers necessary:

(A) Oral and written statements;

(B) Submission of written direct testimony as required or authorized by the Presiding Officer;

(C) Oral direct and cross-examination of a witness where necessary as prescribed in paragraph (p) of this section; and

(D) Oral argument, if appropriate;

(iii) Identify matters of which official notice may be taken;

(iv) Consider limitation of the number of expert and other witnesses;

(v) Consider the procedure to be followed at the hearing; and

(vi) Consider any other matter that may expedite the hearing or aid in the disposition of the issue.

(2) The Presiding Officer shall summarize in writing the results of any conference, including all stipulations, if not transcribed, and shall make the summary part of the record.

(l) *Primary discovery (exchange of witness lists and documents).* (1) At a prehearing conference or within some reasonable time set by the Presiding Officer prior to the hearing, each party shall make available to the other parties the names of the expert and other witnesses the party expects to call, together with a brief summary of their expected testimony and a list of all documents and exhibits which the party expects to introduce into evidence. Thereafter, witnesses, documents, or exhibits may be added and summaries of expected testimony amended upon motion by a party.

(2) The Presiding Officer, may, upon motion by a party or other person, and for good cause shown, by order—

(i) Restrict or defer disclosure by a party of the name of a witness or a narrative summary of the expected testimony of a witness; and

(ii) Prescribe other appropriate measures to protect a witness.

(3) Any party affected by an action in paragraph (l)(2) of this section shall have an adequate opportunity, once he learns the name of a witness and obtains the narrative summary of his expected testimony, to prepare for the presentation of his case.

(m) *Other discovery.* (1) Except as provided by paragraph (1) of this section, further discovery, under this paragraph is permitted only upon determination by the Presiding Officer—

(i) That this discovery will not in any way unreasonably delay the proceeding;

(ii) That the information to be obtained is not obtainable voluntarily; and

(iii) That the information has significant probative value. The Presiding Officer shall be guided by the procedures set forth in the Federal Rules of Civil Procedure, where practicable, and the precedents thereunder, except that no discovery will be undertaken except upon order of the Presiding Officer or upon agreement of the parties.

(2) The Presiding Officer shall order depositions upon oral questions only upon a showing of good cause and upon a finding that—

(i) The information sought cannot be obtained by alternative methods; or

(ii) There is a substantial reason to believe that relevant and probative evidence may otherwise not be preserved for presentation by a witness at the hearing.

(3) Any party to the proceeding desiring an order of discovery shall make a motion or motions therefor. The motion must include—

(i) The circumstances warranting the taking of the discovery;

(ii) The nature of the information expected to be discovered; and

(iii) The proposed time and place where it will be taken. If the Presiding Officer determines the motion should be granted, he shall issue an order for the taking of the discovery together with the conditions and terms thereof.

(4) Failure to comply with an order issued pursuant to this paragraph may lead to the inference that the information to be discovered would be adverse to the person or party from whom the information was sought.

(n) *Protective orders, in camera proceedings.* (1) Upon motion by a part or by the person from whom discovery is sought, and upon a showing by the movant that the disclosure of the information to be discovered, or a particular part thereof (other than emission data), would result in methods or processes entitled to protection as trade secrets of the person being divulged, the Presiding Officer may enter a protective order with respect to this material. Any protective order will contain terms governing the treatment of the information which are appropriate under the circumstances to prevent disclosure outside the hearing: *Provided,* That the order states that the material will be filed separately from other evidence and exhibits in the hearing. Disclosure is limited to parties to the hearing, their counsel and relevant technical consultants, and authorized representatives of the United States concerned with carrying out the Act. Except in the case of the government, disclosure may be limited to counsel for parties who shall not disclose such information to the parties themselves. Except in the case of the government, disclosure to a party or his counsel is conditioned on execution of a sworn statement that no disclosure of the information will be made to persons not entitled to receive it under the terms of the protective order. (This provision is not necessary where government employees are concerned because disclosure by them is subject to the terms of 18 U.S.C. 1905.)

(2)(i) A party or person seeking a protective order may be permitted to make all or part of the required showing in camera. A record will be made of the in camera proceedings. If the Presiding Officer enters a protective order following a showing in camera, the record of the showing will be sealed and preserved and made available to the Agency or court in the event of appeal.

(ii) Attendance at any in camera proceeding may be limited to the Presiding Officer, the Agency, and the person or party seeking the protective order.

(3) Any party, subject to the terms and conditions of any protective order issues pursuant to paragraph (n)(1) of this section, desiring for the presentation of his case to make use of any in camera documents or testimony, shall make application to the Presiding Officer by motion setting forth the justification therefor. The Presiding Officer, in granting this motion, shall enter an order protecting the rights of the affected persons and parties and preventing unnecessary disclosure of this information, including the presentation of the information and oral testimony and cross-examination concerning it in executive session, as in his discretion is necessary and practicable.

(4) In the submittal of proposed findings, briefs, or other papers, counsel for all parties shall make a good faith attempt to refrain from disclosing the specific details of in camera documents and testimony. This shall not preclude references in these proposed findings, briefs, or other papers to the documents or testimony, including generalized statements based on their contents. To the extent that counsel considers it necessary to include specific details in their presentations, these details will be incorporated in separate proposed findings, briefs, or other paper marked "confidential", and wil become part of the in camera record.

(o) *Motions.* (1) All motions, except those made orally during the course of the hearing, must be in writing and state with particularity the grounds therefor, set forth the relief or order sought, and be filed with the Hearing Clerk and served upon all parties.

(2) Within the time fixed by the Administrator, the judicial officer, or the Presiding Officer, as appropriate, any party may serve and file an answer to the motion. The movant shall, if requested by the Administrator, the ju-

dicial officer, or the Presiding Officer, as appropriate, serve and file reply papers, within the time set by the request.

(3) The Presiding Officer shall rule upon all motions filed or made prior to the filing of his decision or accelerated decision, as appropriate. The Administrator or the judicial officer, as appropriate, shall rule upon all motions filed prior to the appointment of a Presiding Officer and all motions filed after the filing of the decision of the Presiding Officer or accelerated decision. Oral argument of motions will be permitted only if the Presiding Officer, the Administrator or the judicial officer, as appropriate, considers it necessary.

(p) *Evidence.* (1) The official transcripts and exhibits, together with all papers and requests filed in the proceeding, consitute the record. Immaterial or irrelevant part of an admissible document will be segregated and excluded so far as practicable. Documents or parts thereof subject to a protective order under pargarph (n) of this section wil be segregated. Evidence may be received at the hearing even though inadmissible under the rules of evidence applicable to judicial proceedings. The weight to be given evidence will be determined by its reliability and probative value.

(2) The Presiding Officer shall allow the parties to examine and cross-examine a witness to the extent that this examination and cross-examination is necssary for a full and true disclosure of the facts.

(3) Ruling of the Presiding Officer on the admissibility of evidence, the propriety of examination and cross-examination, and other procedural matters will appear in the record.

(4) Parties shall automatically be presumed to have taken exception to an adverse ruling.

(q) *Record.* (1) Hearings will be stenographically reported and transcribed and the original transcripts will be part of the record and the sole official transcript. Copies of the record will be filed with the Hearing Clerk and made available during Agency business hours for public inspection. Any thereof, except as provided in paragraph (n) of this section, shall be entitled to the same upon payment of the cost thereof.

(2) The official transcripts and exhibits, together with all paper and requests filed in the proceeding, constitute the record.

(r) *Proposed findings, conclusions.* (1) Within four (4) days of the close of the reception of evidence, or within such longer time as the Presiding Officer may fix, any party may submit for the consideration of the Presiding Officer proposed findings of fact, conclusions of law, and proposed order, together with reasons therefor and briefs in support thereof. These proposals will be in writing, be served upon all parties, and contain adequate references to the record and authorities relied upon.

(2) The record will show the Presiding Officer's ruling on the proposed findings and conclusions except when his order disposing of the proceeding otherwise informs the parties of the action taken by him thereon.

(s) *Decision of the Presiding Officer.* (1) Unless extended by the Administrator, the Presiding Officer shall issue and file with the Hearing Clerk his decision within fourteen (14) days (or within seven (7) days in the case of a hearing requested under § 86.1012-84(l)) after the period for filing proposed findings as provided for in paragraph for in paragraph (r) of this section has expired.

(2) The Presiding Officer's decision becomes the decision of the Administrator—

(i) When no notice of intention to appeal as described in paragraph (t) and (u) of this section is filed, ten (10) days after issuance thereof, unless in the interim the Administrator shall have acted to review or stay the effective date of the decision; or

(ii) When a notice of intention to appeal is filed but the appeal is not perfected as required by paragraph (t) or (u) of this section, five (5) days after the period allowed for perfection of an appeal has expired unless within that five (5) day period, the Administrator shall have acted to review or stay the effective date of the decision.

(3) The Presiding Officer's decision must include a statement of findings and conclusions, as well as the reasons

or basis therefor, upon all the material issues of fact or law presented on the record and an appropriate rule or order. The decision must be supported by substantial evidence and based upon a consideration of the whole record.

(4) At any time prior to the issuance of his decision, the Presiding Officer may reopen the proceeding for the reception of further evidence. Except for the correction of clerical errors, the jurisdiction of the Presiding Officer is terminated upon the issuance of his decision.

(t) *Appeal from the decision of the Presiding Officer.* (1) Any party to a proceeding may appeal the Presiding Officer's decision to the Administrator: *Provided,* That within ten (10) days after issuance of the Presiding Officer's decision the party files a notice of intention to appeal and an appeal brief within twenty (20) days of the decision.

(2) When an appeal is taken from the decision of the Presiding Officer, any party may file a brief with respect to the appeal. The party shall file the brief within fifteen (15) days of the date of the filing of the appellant's brief.

(3) Any brief filed pursuant to this paragraph will contain, in the order indicated, the following:

(i) A subject index of the matter in the brief, with page references, and a table of cases (alphabetically arranged), textbooks, statutes, and other material cited, with page references thereto;

(ii) A specification of the issues intended to be urged; provided, however, that in the case of a hearing requested under § 86.1012-84(l), the brief will be restricted to the issues specified in paragraph (c)(2)(ii) of this section;

(iii) The argument presenting clearly the points of fact and law relied upon in support of the position taken on each issue, with specific page references to the record and the legal or other material relied upon; and

(iv) A proposed order for the Administrator's consideration if different from the order contained in the Presiding Officer's decision.

(4) No brief in excess of 40 pages will be filed without leave of the Administrator.

(5) The Administrator may allow oral argument.

(u) *Summary appeal.* (1) In the case of a hearing requested under § 86.1012-84(l), any appeal taken from the decision of the Presiding Officer will be conducted under this subsection.

(2) Any party to the proceeding may appeal the Presiding Officer's decision to the Administrator by filing a notice of appeal within ten (10) days.

(3) The notice of appeal must be in the form of a brief and conform to the requirements of paragraph (t)(3) of this section.

(4) Within ten (10) days after a notice of appeal from the decision of the Presiding Officer is filed under this paragraph, any party may file a brief with respect to that appeal.

(5) No brief in excess of fifteen (15) pages will be filed without leave of the Administrator.

(v) *Review of the Presiding Officer's decision in the absence of appeal.* (1) If, after the expiration of the period for taking appeal as provided for by paragraphs (t) or (u) of this section, no notice of intention to appeal the decision of the Presiding Officer has been filed, or if filed, not perfected, the Hearing Clerk shall so notify the Administrator.

(2) The Administrator, upon receipt of notice from the Hearing Clerk that no notice of intention to appeal has been filed, or if filed, not perfected pursuant to paragraphs (t) or (u) of this section, may, on his own motion, within the time limits specified in paragraph (s)(2) of this section, review the decision of the Presiding Officer. Notice of the intention of the Administrator to review the decision of the Presiding Officer will be given to all parties and will set forth the scope of the review and the issues to be considered and will make provision for filing of briefs.

(w) *Decision of appeal or review.* (1) Upon appeal from or review of the Presiding Officer's decision, the Administrator shall consider such parts of the record as are cited or as may be necessary to resolve the issues present-

ed and in addition shall, to the extent necessary or desirable, exercise all the powers which he could have exercised if he had presided at the hearing.

(2) In rendering his decision, the Administrator shall adopt, modify or set aside the findings, conclusions, and order contained in the decision of the Presiding Officer and shall set forth in his decision a statement of the reasons or basis for his action.

(3) In those cases where the Administrator believes that he should have further information or additional views of the parties as to the form and content of the rule or order to be issued, the Administrator, in his discretion, may withhold final action pending the receipt of the additional information or views, or may remand the case to the Presiding Officer.

(4) Any decision rendered under this paragraph which completes disposition of a case constitutes a final decision of the Administrator.

(x) *Reconsideration.* (1) Within twenty (20) days after issuance of the Administrator's decision, any party may file with the Administrator a petition for reconsideration of this decision, setting forth the relief desired and the grounds in support thereof. Any petition filed under this subsection must be confined to new questions raised by the decision or final order and upon which the petitioner had no opportunity to argue before the Presiding Officer or the Administrator: *Provided,* however, that in the case of a hearing requested under § 86.1012-84(l) these questions will be limited to the issues specified in paragraph (c)(2)(ii) of this section.

(2) Any party desiring to oppose this petition shall file an answer thereto within ten (10) days after the filing of the petition. The filing of a petition for reconsideration does not operate to stay the effective date of the decision or order or to toll the running of any statutory time period affecting the decision or order unless specifically so ordered by the Administrator.

(y) *Accelerated decision, dismissal.* (1) The Presiding Officer, upon motion of any party or sua sponte, may at any time render an accelerated decision in favor of the Agency or the manufacturer as to all or any part of the proceeding, without further hearing or upon limited additional evidence such as affidavits which he may require, or dismiss any party with prejudice, for any of the following reasons:

(i) Failure to state a claim upon which relief can be granted, or direct or collateral estoppel;

(ii) The lack of any genuine issue of material fact, causing a party to be entitled to judgment as a matter of law; or

(iii) Such other reasons as are just, including specifically failure to obey a procedural order of the Presiding Officer.

(2) If, under this subsection, an accelerated decision is issued as to all the issues and claims joined in the proceeding, the decision will be treated for the purposes of these procedures as the decision of the Presiding Officer as provided in paragraph (s) of this section.

(3) If, under this subsection, judgment is rendered on less than all issues or claims in the proceeding, the Presiding Officer shall determine what material facts exist without substantial controversy and what material facts are actually and in good faith controverted. He shall thereupon issue an order specifying the facts which appear without substantial controversy, and the issues and claims upon which the hearing will proceed.

(z) *Conclusion of hearing.* (1) If, after the expiration of the period for taking an appeal as provided for by paragraphs (t) and (u) of this section, no appeal has been taken from the Presiding Officer's decision, and after the expiration of the period for review by the Administrator on his own motion as provided for by paragraph (v) of this section, the Administrator does not move to review the decision, the hearing is considered ended at the expiration of all periods allowed for the appeal and review.

(2) If an appeal of the Presiding Officer's decision is taken pursuant to paragraphs (t) and (u) of this section, or if, in the absence of this appeal, the Administrator moves to review the decision of the Presiding Officer pursuant to paragraph (v) of this section, the hearing is considered ended upon

the rendering of a final decision by the Administrator.

(aa) *Judicial review.* (1) The Administrator shall designate the General Counsel, Environmental Protection Agency as the officer upon whom copy of any petition for judicial review must be served. This officer shall be responsible for filing in the court the record on which the order of the Administrator is based.

(2) Before forwarding the record to the court, the Agency shall advise the petitioner of costs of preparing it and as soon as payment to cover fees is made, shall forward the record to the court.

Subparts L–M [Reserved]

Subpart N—Emission Regulations for New Gasoline-Fueled and Diesel Heavy-Duty Engines; Gaseous Exhaust Test Procedures

SOURCE: 45 FR 4181, Jan. 21, 1980, unless otherwise noted.

§ 86.1301-84 Scope; applicability.

This subpart contains gaseous emission test procedures for gasoline-fueled and diesel heavy-duty engines. It applies to 1984 and later model years.

§ 86.1302-84 Definitions.

The definitions in § 86.084-2 apply to this subpart.

§ 86.1303-84 Abbreviations.

The abbreviations in § 86.084-3 apply to this subpart.

§ 86.1304-84 Section numbering; construction.

(a) The model year of initial applicability is indicated by the section number. The two digits following the hyphen designate the first model year for which a section is effective. A section remains effective until superseded.

Example: Section § 86.1311-84 applies to the 1984 and subsequent model years until superseded. If a section § 86.1311-88 is promulgated it would take effect beginning with the 1988 model year; § 86.1311-84 would apply to model years 1984 through 1987.

(b) A section reference without a model year suffix refers to the section applicable for the appropriate model year.

(c) Unless indicated, all provisions in this subpart apply to both gasoline-fueled and diesel heavy-duty engines.

§ 86.1305-84 Introduction; structure of subpart.

(a) This subpart describes the equipment required and the procedures to follow in order to perform exhaust emission tests on gasoline-fueled and diesel heavy-duty engines. Subpart A sets forth the testing requirements and test intervals necessary to comply with EPA certification procedures.

(b) Four topics are addressed in this subpart. Sections 86.1306-84 through 86.1315-84 set forth specifications and equipment requirements; §§ 86.1316-84 through 86.1326-84 discuss calibration methods and frequency; test procedures are listed in §§ 86.1327-84 through 86.1341-84; calculation formulas are found in § 86.1342-84; data requirements are found in § 86.1344-84.

§ 86.1306-84 Equipment required and specifications; overview.

(a) This subpart contains procedures for exhaust emissions tests on diesel or gasoline-fueled heavy-duty engines. Equipment required and specifications are as follows:

(1) *Exhaust emission tests.* All engines subject to this subpart are tested for exhaust emissions. Diesel and gasoline-fueled engines are tested identically with the exception of hydrocarbon measurements; diesel engines require a heated hydrocarbon detector, § 86.1310-84. Necessary equipment and specifications appear in §§ 86.1308-84 through 86.1311-84.

(2) *Fuel, analytical gas, and engine cycle specifications.* Fuel specifications for exhaust emission testing are specified in § 86.1313-84. Analytical gases are specified in § 86.1314-84. The EPA heavy-duty transient engines cycles for use in exhaust testing are described in § 86.1333-84 and specified in Appendix I.

§ 86.1307-84 [Reserved]

§ 86.1308-84 Dynamometer and engine equipment specifications.

(a) *Engine dynamometer.* The engine dynamometer system must be capable of controlling engine torque and rpm simultaneously over transient cycles. The transient torque and rpm schedules described in § 86.1333-84 and specified Appendix I (f and g) must be followed within the accuracy requirements specified in § 86.1341-84. In addition, to these general requirements, the dynamometer read out and read out signals for speed and torque shall meet the following accuracy specifications:

(1) Engine speed shall be accurate to within 2 percent of point at all speeds.

(2) Engine torque at the flywheel shall be accruate to within 3 percent of point at all torque settings above 10 percent of full-scale of the torque measuring device. Below 10 percent of full-scale, the torque measuring device shall have an accuracy of:

(i) ± 2.5 ft.-lbs., if the full scale value is 550 ft.-lbs. or less.

(ii) ± 5 ft.-lbs., if the full scale value is 1050 ft.-lbs. or less.

(iii) ± 10 ft.-lbs., if the full scale value is greater than 1050 ft.-lbs.

(3) *Option:* Internal dynamometer signals (i.e., armature current, etc.) may be used for torque measurement provided that it can be shown that the true engine flywheel torque during the test cycle conforms to the test cycle values as specified in § 86.1333-84, and if the technique is approved in advance by the Administrator. The minimum requirement for the Administrator's approval would include compensation for increased or decreased flywheel torque due to the armature inertia during accelerations and decelerations in the test cycle. Engineering data and comparison test results may be required.

(b) *Cycle verification equipment.* In order to verify that the test engine has followed the test cycle correctly, the dynamometer read out signals for speed and torque must be collected in a manner that allows a statistical correlation between the actual engine performance and the test cycle (See § 86.1341-84). Normally this collection process would involve conversion of analog dynamometer signals into digital values for storage in a computer. The conversion of dynamometer read out values into values (computer or other) that are used to evaluate the validity of engine performance in relation to the test cycle shall be performed in a manner such that:

(1) Speed values used for cycle evaluation are accurate to within 2 percent of the dynamometer speed read out value.

(2) Engine flywheel torque values used for cycle evaluation are accurate to within 3 percent of the dynamometer torque read out value.

(c) *Option:* For some systems it may be more convenient to combine the tolerances in paragraphs (a) and (b) of this section. This is permitted if the root mean square method (RMS) is used. The RMS values would then refer to accuracy in relationship to true value.

(1) Speed values used for cycle evaluation shall be accurate to within 2.8 percent of true value.

(2) Engine flywheel torque value used for cycle evaluation shall be accurate to within 4.2 percent of true value.

(d) *Speed calibration equipment.* A 60-tooth (or greater) wheel in combination with a common mode rejection frequency counter is considered an absolute standard for engine or dynamometer speed.

(e) *Torque calibration equipment.* Two techniques are allowed for torque calibration. Alternate techniques may be used if shown to be equivalent, and if prior approval is obtained from the Administrator.

(1) The lever-arm dead-weight technique involves the placement of known weights a known distance from the center of rotation of the torque measuring device. The equipment required are:

(i) *Calibration weights.* A minimum of 6 calibration weights for each range of torque measuring device used are required. The weights must be approximately equally spaced and each must be accurate to 0.5 percent of National Bureau of Standards weights. Laboratories located in foreign countries may certify calibration weights to

local government bureau standards. Certification of weight accuracy by state government Bureau of Weights and Measures is acceptable. Effects of changes in gravitational constant at the test site may be accounted for if desired.

(ii) A lever arm with a minimum length of 24 inches. The distance from the center of the engine torque measurement device to the point of weight application shall be accurate to within 0.010 inches. The arm must be balanced or the hanging torque of the arm must be known within ±0.1 ft.-lbs.

(2) The transfer technique involves the use of a master load cell with a method of loading (usually hydraulic) the torque measuring device, or master unit that applies a known force to the torque measuring device based on piston area and pressure. The equipment required are:

(i) A master load cell or force application unit that must be calibrated at each test weight specified in paragraph (e)(1)(i) of this section with known weights traceable to within 0.1 percent of NBS weights. The provision on traceability in paragraph (e)(1)(i) apply to this section. The overall accuracy of the calibration curve of torque applied to the engine torque sensor as determined by the master units shall be within 0.5 percent of true value. Below 10 percent of full scale of the master unit the calibration curve of torque applied to the engine torque sensor shall be accurate to:

(A) ±0.5 ft.-lbs. of true value if full scale value is 550 ft.-lbs. or less.

(B) ±1.0 ft.-lbs. of true value if full scale value is 1050 ft.-lbs. or less.

(C) ±2.0 ft.-lbs. of true value if full scale value is greater than 1050 ft.-lbs.

(ii) A lever arm with a minimum length of 24 inches. The distance from the center of the engine torque measuring device to the point of force meas-urement or application shall be accurate to within 0.010 inches. The arm must be balanced or the hanging torque of the arm must be known within ±0.1 ft.-lbs.

(iii) Transfer of calibration or span from a dynomometer "case" torque value to the engine flywheel torque measuring device is permitted only under static or steady state conditions.

(3) Other techniques may be used if shown to be equivalent and if approved by the Administrator.

§ 86.1309-84 Exhaust gas sampling system; gasoline-fueled engines.

(a)(1) *General.* The exhaust gas sampling system is designed to measure the true mass emissions of engine exhaust. In the CVS concept of measuring mass emissions, two conditions must be satisfied: the total volume of the mixture of exhaust and dilution air must be measured, and a continuously proportioned sample of volume must be collected for analysis. Mass emissions are determined from the sample concentration and total flow over the test period. The sampling and continuous analysis system specified in § 86.1310-84 for diesel engines may be used for testing gasoline-fueled engines if the systems meet all of the requirements for such systems as specified in this Subpart.

(2) *Positive displacement pump.* The positive displacement pump—constant volume sampler (PDP-CVS), Figure N83-1, satisfies the first condition by metering at a constant temperature and pressure through the pump. The total volume is measured by counting the revolutions made by the calibrated positive displacement pump. The proportional sample is achieved by sampling at a constant flow rate.

(3) *Critical flow venturi.* The operation of the critical flow venturi-constant volume sampler (CFV-CVS), Figure N84-2, is based upon the principles of fluid dynamics associated with critical flow. The CVF system is commonly called a constant volume system (CVS) even though the flow varies. It would be more proper to call the critical flow venturi (CFV) system a constant proportion sampling system since proportional sampling throughout temperature excursions is maintained by use of a small CFV in the sample line. The variable mixture flow

rate is maintained at sonic velocity, which is inversely proportional to the square root of the gas temperature, and is computed continuously. Since the pressure and temperature are the same at both venturi inlets, the sample volume is proportional to the total volume.

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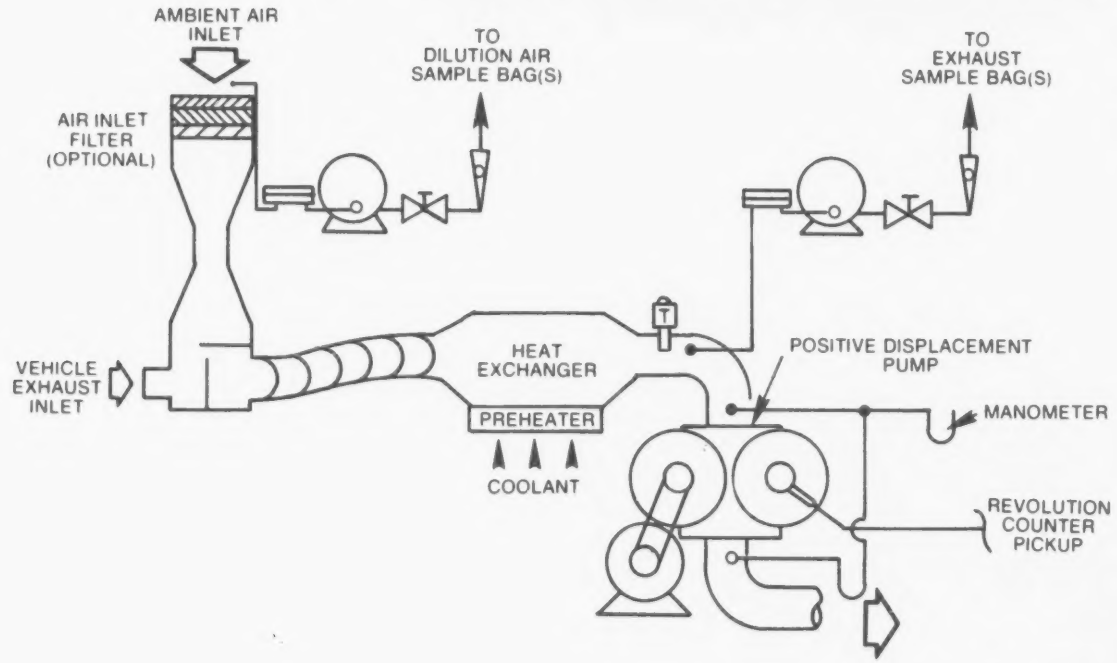
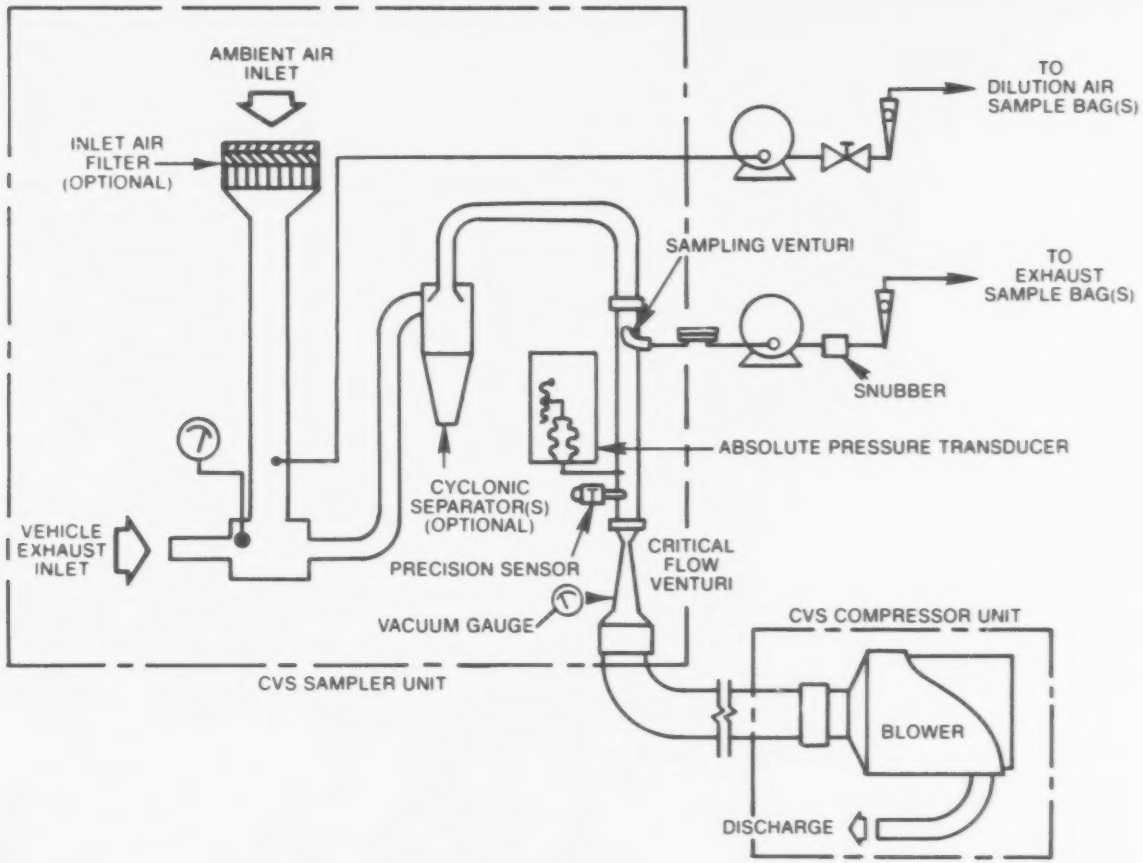


(SEE FIG. N84-5 FOR SYMBOL LEGEND)

FIGURE N84-1 — EXHAUST GAS SAMPLING SYSTEM PDP-CVS

FOR GASOLINE FUELED ENGINES



(SEE FIG. N84-5 FOR SYMBOL LEGEND)

FIGURE N84-2 — EXHAUST GAS SAMPLING SYSTEM (CFV-CVS)
FOR GASOLINE FUELED ENGINES

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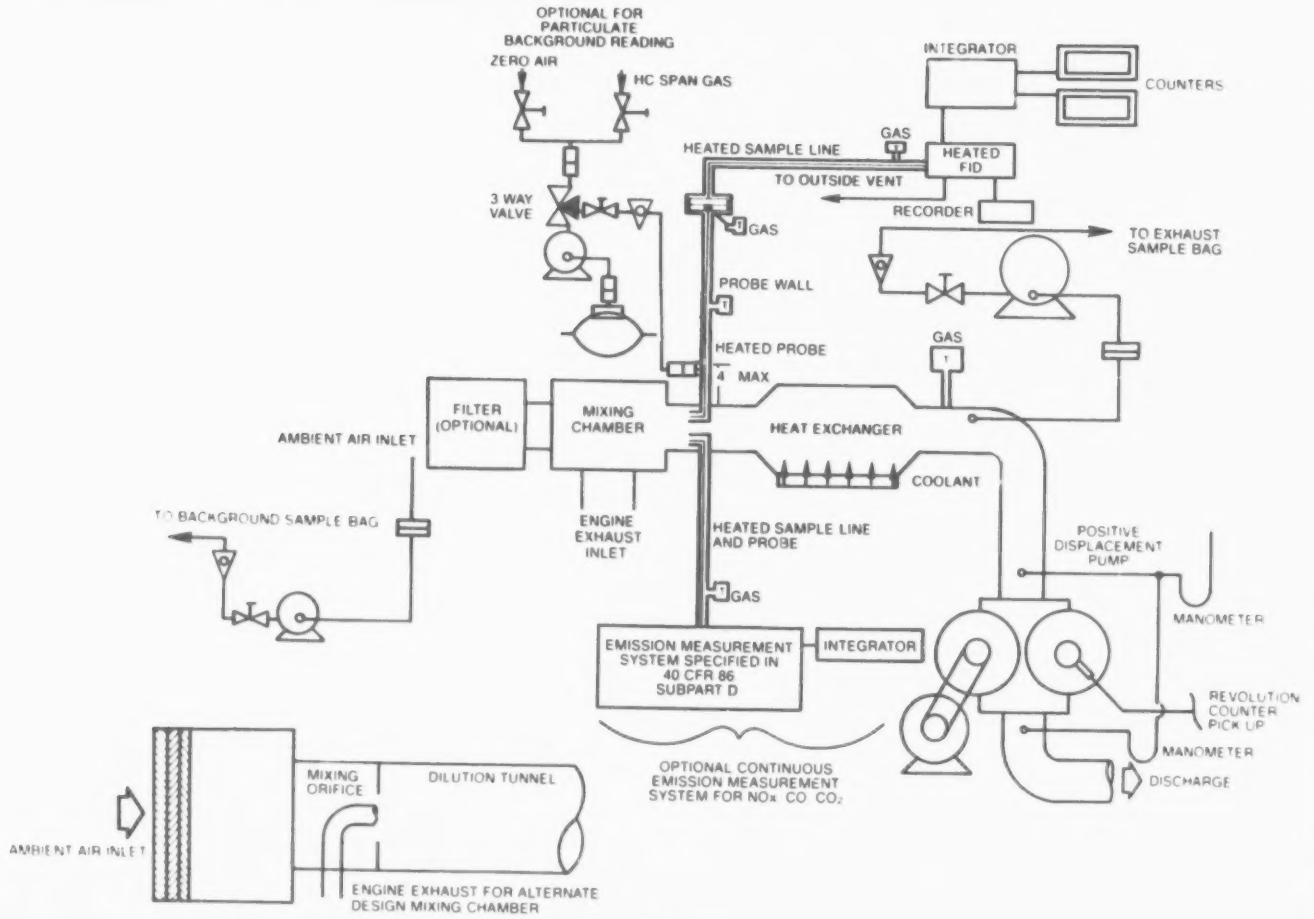

FIGURE N84-3
GASEOUS EMISSIONS SAMPLING SYSTEM (PDP-CVS)
(FOR DIESEL ENGINES ONLY)
(SEE FIGURE N84-5 FOR SYMBOL LEGEND)

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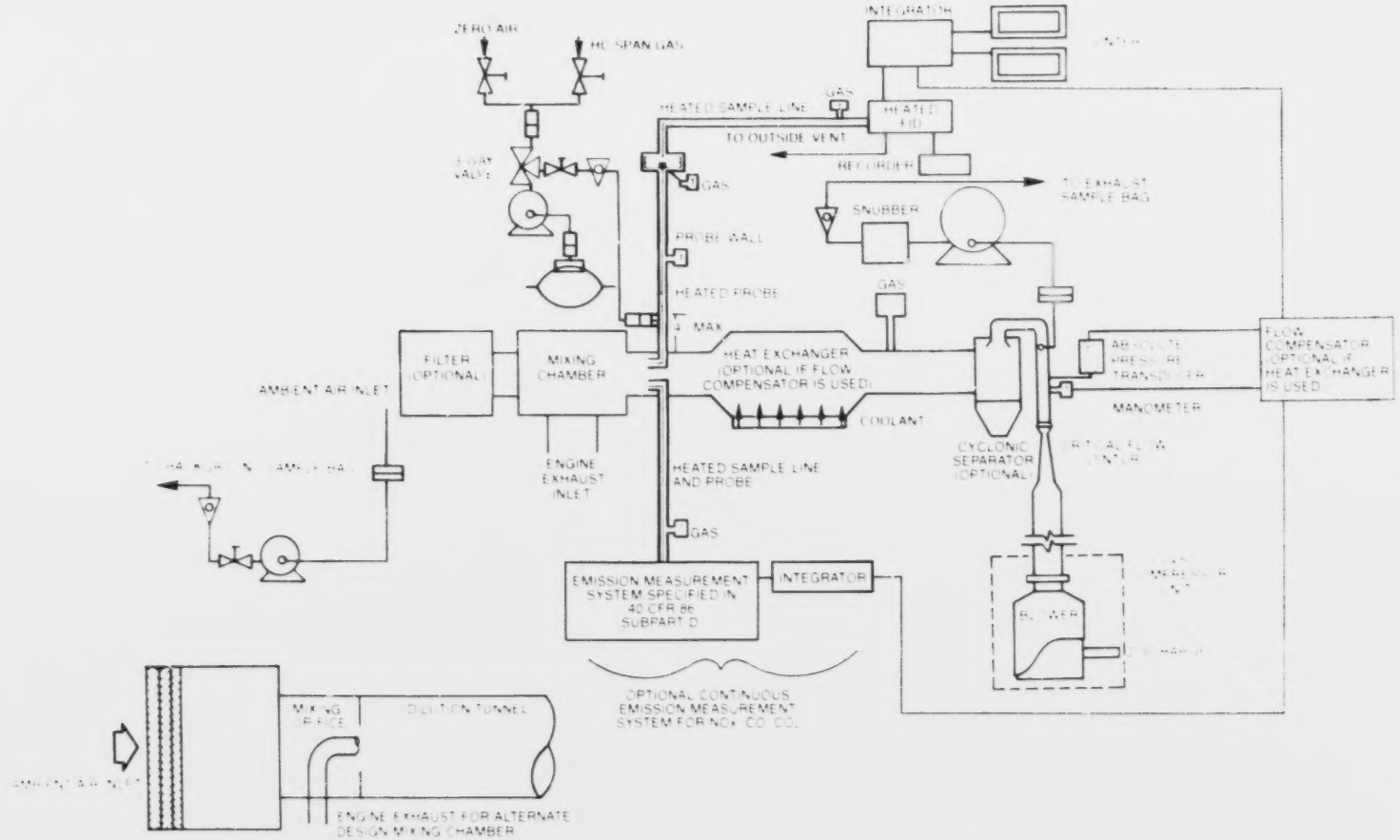

FIGURE N84-4
GASEOUS EMISSIONS SAMPLING SYSTEM (CFV-CVS)
(FOR DIESEL ENGINES ONLY)
(SEE FIGURE N84-5 FOR SYMBOL LEGEND)

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(4) *Other systems.* Other sampling and/or analytical systems including the systems described in § 86.1310-84 for diesel engines may be used if shown to yield equivalent results, and if approved in advance by the Administrator.

(b) *Component description, PDP-CVS.* The PDP-CVS, Figure N84-1, consists of a dilution air filter and mixing assembly, heat exchanger, positive displacement pump, sampling system, and associated valves, pressure and temperature sensors. The PDP-CVS shall conform to the following requirements:

(1) Static pressure variations at the tailpipe(s) of the engine shall remain within ±5 inches of water (1.2 kPa) of the static pressure variations measured during a dynamometer engine cycle with no connection to the tailpipe(s). (Sampling systems capable of maintaining the static pressure to within ±1 inch of water (0.25 kPa) will be used by the Administrator if a written request substantiates the need for this closer tolerance.)

(2) The gas mixture temperature, measured at a point immediately ahead of the positive displacement pump, shall be within ±10° F (5.6° C) of the designed operating temperature at the start of the test. The designed operating temperature may be estimated from the average operating temperature from similar tests. The gas mixture temperature variation (after the heat exchanger) during the entire test shall be limited to ±10° F (5.6° C) from its value at the start of the test. The temperature measuring system shall have an accuracy and precision of ±2° F (1.1° C).

(3) The pressure gauges shall have an accuracy and precision of ±3 mm Hg (0.4 kPa).

(4) The flow capacity of the CVS shall be large enough to eliminate water condensation in the system.

(5) Sample collection bags for dilution air and exhaust samples shall be sufficient size so as not to impede sample flow.

(c) *Component description, CFV-CVS.* The CFV-CVS, Figure N84-2 consists of a dilution air filter (optional) and mixing assembly, optional cyclonic particulate separator(s), sampling venturi, critical flow venturi, sampling system, and assorted valves, pressure and temperature sensors.

The CFV-CVS shall conform to the following requirements:

(1) Static pressure variations at the tailpipe(s) of the vehicle shall remain within ±5 inches of water (1.2 kPa) of the static pressure variations measured during a dynamometer engine cycle with no connection to the tailpipe(s). (Sampling systems capable of maintaining the static pressure to within ±1 inch of water (0.25 kPa) will be used by the Administrator if a written request substantiates the need for this closer tolerance.)

(2) The temperature measuring system shall have an accuracy and precision of ±2° F (1.1° C) and a response time of 0.100 seconds to 62.5 percent of a temperature change (as measured in hot silicone oil).

(3) The pressure measuring system shall have an accuracy and precision of ±3 mm Hg (0.4 kPa).

(4) The flow capacity of the CVS shall be large enough to prevent water condensation in the system.

(5) Sample collection bags for dilution air and exhaust samples shall be of sufficient size so as not to impede sample flow.

§ 86.1310-84 Exhaust gas sampling and analytical system; diesel engines.

(a) *General.* The exhaust gas sampling system described in this paragraph is designed to measure the true mass of gaseous emissions in the exhaust of heavy-duty diesel engines. This system utilizes the CVS concept (described in § 86.1309-84) of measuring mass emissions of NO_x, CO, and CO_2. A continuously integrated system is required for HC measurement, and is allowed for NO_x, CO, and CO_2. The mass of gaseous emissions is determined from the sample concentration and total flow over the test period. General requirements are as follows:

(1) This sampling system requires the use of a PDP-CVS, or a CFV-CVS with heat exchanger or with electronic flow compensation. Figure N84-3 is a schematic drawing of the PDP system. Figure N84-4 is a schematic drawing of the CFV system.

(2) The HC analytical system for diesel engines requires a heated flame ionization detector (HFID) and heated sample system:

(i) The HFID sample must be taken directly from the diluted exhaust stream through a heated probe and integrated continuously over the test cycle. Unless compensation for varying flow is made, the HFID must be used with a constant flow system to insure a representative sample.

(ii) The heated probe shall be located downstream of a mixing chamber that provides a uniform sample distribution across the CVS duct.

(iii) A dilution tunnel similar to those used for diesel particulate sampling may be used as a mixing chamber.

(3) *Option:* (i) Continuously integrated measurement of dilute NO_x, CO, and CO_2 is permitted; however, prior approval of the Administrator is required. Test results will be required as well as engineering data and detailed system specifications to gain this approval. Minimum requirements and technical specifications are given in paragraph (b)(5) of this section.

(4) Bag sampling (§ 86.1309-84) and analytical (§ 86.1311) capabilities as shown in N84-3 (or Figure N84-4) are required if NO_x, CO, or CO_2 are not measured continuously.

(5) Since various configurations can produce equivalent results, exact conformance with these drawings is not required. Additional components such as instruments, valves, solenoids, pumps, and switches may be used to provide additional information and coordinate the functions of the component systems.

(6) Other sampling and/or analytical systems may be used if shown to yield equivalent results and if approved in advance by the Administrator.

(b) *Component description.* The components necessary for diesel exhaust sampling shall meet the following requirements:

(1) The PDP-CVS, shall conform to all of the requirements listed for the exhaust gas PDP-CVS (§ 86.1309-84(b)). The flow capacity of the CVS must be sufficient to maintain the diluted exhaust stream at a temperature of 375° F (191° C) of less at the sampling zone.

(2) The CFV-CVS shall conform to all of the requirements listed for the exhaust gas CFV-CVS (§ 86.1309-84(c)), along with the following requirements.

(i) The flow capacity of the CVS must be sufficient to maintain the diluted exhaust stream at a temperature of 375° F (191° C) or less at the sampling zone.

(ii) A heat exchanger or electronic flow compensator is required (see Figure N84-4).

(3) Continuous HC measurement system.

(i) The continuous HC sample system (as shown in Figure N84-3 or N84-4) shall be an "overflow calibration (or span) gas" type system. In this type of system, excess span or calibration gas spills out of the probe during calibration of the analyzer.

(ii) No other analyzers may draw a sample from the continuous HC sample probe, line or system.

(iii) The span, calibration, or background sample flow rates into the sample line shall be between 190 and 210 percent of the HFID analyzer flow rate.

(iv) The span, calibration or background gases shall enter the heated sample line no farther than 4 inches from the CVS duct or dilution tunnel outside surface.

(v) The continuous hydrocarbon probe shall be:

(A) Installed in the dilute stream facing upstream at a point where the dilution air and exhaust are well mixed.

(B) Sufficiently distant (radially) from other probes so as to be free from the influence of any wakes or eddies produced by other probes.

(C) Heated and insulated over the engine length to maintain a 375°±20° F (191°±11° C) *wall* temperature.

(D) 0.5. in (1.27 cm) minimum inside diameter.

(E) It is intended that the total hydrocarbon probe be free from cold spots (i.e., free from spots where the probe wall temperature is less than 355° F (180° C)).

(vi) The dilute exhaust gas flowing in the total hydrocarbon sample system shall be:

(A) At 375° ± 10° F (191° ± 6° C) immediately before the heated filter. This *gas* temperature will be determined by a temperature sensor located immediately upstream of the filter. The sensor shall have an accuracy and precision of ± 2° F (1.1° C).

(B) At 375° ± 10° F (191° ± 6° C) immediately before the HFID. This *gas* temperature will be determined by a temperature sensor located at the exit of the heated sample line. The sensor shall have an accuracy and precision of ± 2° F (1.1° C).

(C) It is intended that the dilute exhaust gas flowing in the total hydrocarbon sample system be between 365° F and 385° F (185° C and 197° C) *gas* temperature.

(vii) The response time of the continuous measurement system shall be:

(A) 1.5 seconds from an instantaneous step change at the probe entrance to the analyzer to within 90 percent of the step change.

(B) 5.5. seconds from an instantaneous step change at the entrance to the sample probe or overflow span gas port to within 90 percent of the step change.

(C) For the purpose of verification of response times, the step change shall be at least 60 percent of full-scale chart deflection.

(4) Mixing chamber.

(i) The mixing chamber shall be designed to fully mix the dilution air and exhaust gas while minimizing HC hang up in the system between the entrance of the exhaust gas into the system and the HC sample probe.

(ii) A dilution tunnel similar to those used for diesel particulate testing may be used as a mixing chamber (See Figures N84-3 and N84-4). It shall have the following criteria:

(A) The tunnel shall be of sufficient size to permit development of turbulent flow (Reynold's No. >4000) and complete mixing of the exhaust and dilution air between a mixing orifice;

(B) The engine exhaust shall be directed downstream at the point where it is introduced into the dilution tunnel;

(C) At least 18.0 inches (45.7 cm) in diameter;

(D) Constructed of electrically conductive material which does not react with the exhaust components;

(E) Electrically grounded;

(F) The temperature of the diluted exhaust stream inside of the dilution tunnel shall be sufficient to prevent water condensation;

(G) The continuous hydrocarbon probe shall be installed in the dilution tunnel facing upstream at a point where the dilution air and exhaust are well mixed (i.e., approximately 10 tunnel diameters downstream of the point where the exhaust gas enters the dilution tunnel);

(H) All other factors of the continuous HC measurement system paragraph (b)(3) of this section, shall meet the requirement specified in this subpart for diesel HC measurement systems.

(5) Optional continuously integrated NO_x, CO, and CO_2 measurement system.

(i) The sample probe shall:

(A) Be in the same plane as the continuous HC probe, but shall be sufficiently distant (radially) from other probes so as to be free from the influences of any wakes or eddies produced by other probes.

(B) Shall face upstream.

(C) Heated and insulated over the entire length to prevent water condensation, minimum temperature is 55° C (131° F). Sample *gas* temperature immediately before the first filter in the system shall be at least 55° C (131° F).

(ii) The continuous NO_x, CO, or CO_2 sampling and analysis system shall conform to the specifications of 40 CFR Part 86, Subpart D with the following exceptions and revisions:

(A) The system components required to be heated by Subpart D need only be heated to prevent water condensation, the minimum temperature allowed is 55° C (131° F).

(B) The system response defined in § 86.329-79 shall be no greater than 5.5 seconds. Longer response time may be allowed if analysis system response time is coordinated with CVS flow fluctuations, is shown to be equivalent to the 5.5 second system, and if prior

approval is granted by the Administrator.

(C) Alternative NO_x measurement techniques outlined in § 86.346-79 are not permitted for NO_x measurement in this subpart.

(D) All analytical gases shall conform to the specifications of § 86.1314-84.

(E) Any range on a linear analyzer below 155 ppm shall have and use a calibration curve conforming to § 86.330-79.

(F) The measurement accuracy requirements specified in § 86.338-79 are superseded by those specified in § 86.1338-84.

(iii) The chart deflections of analyzers with non-linear calibration curves shall be converted to concentration values by the calibration curve(s) specified in Subpart D (§ 86.330-79) before flow correction (if used) and subsequent integration takes place.

§ 86.1311-84 Exhaust gas analytical system; CVS bag sample.

(a) *Schematic drawings.* Figure N84-5 is a schematic drawing of the exhaust gas analytical system used for analyzing CVS bag samples from either gasoline-fueled or diesel engines. Since various configurations can produce accurate results, exact conformance with the drawing is not required. Additional components such as instruments, valves, solenoids, pumps and switches may be used to provide additional information and coordinate the functions of the component systems.

(b) *Major component description.* The analytical system, Figure N83-3, consists of a flame ionization detector (FID) for the determination of hydrocarbons , nondispersive infrared analyzers (NDIR) for the determination of carbon monoxide and carbon dioxide and a chemiluminescence analyzer (CL) for the determination of oxides of nitrogen.

The exhaust gas analytical system shall conform to the following requirements:

(1) The CL requires that the nitrogen dioxide present in the sample be converted to nitric oxide before analysis. Other types of analyzers may be used ge if shown to yield equivalent results and if approved in advance by the Administrator.

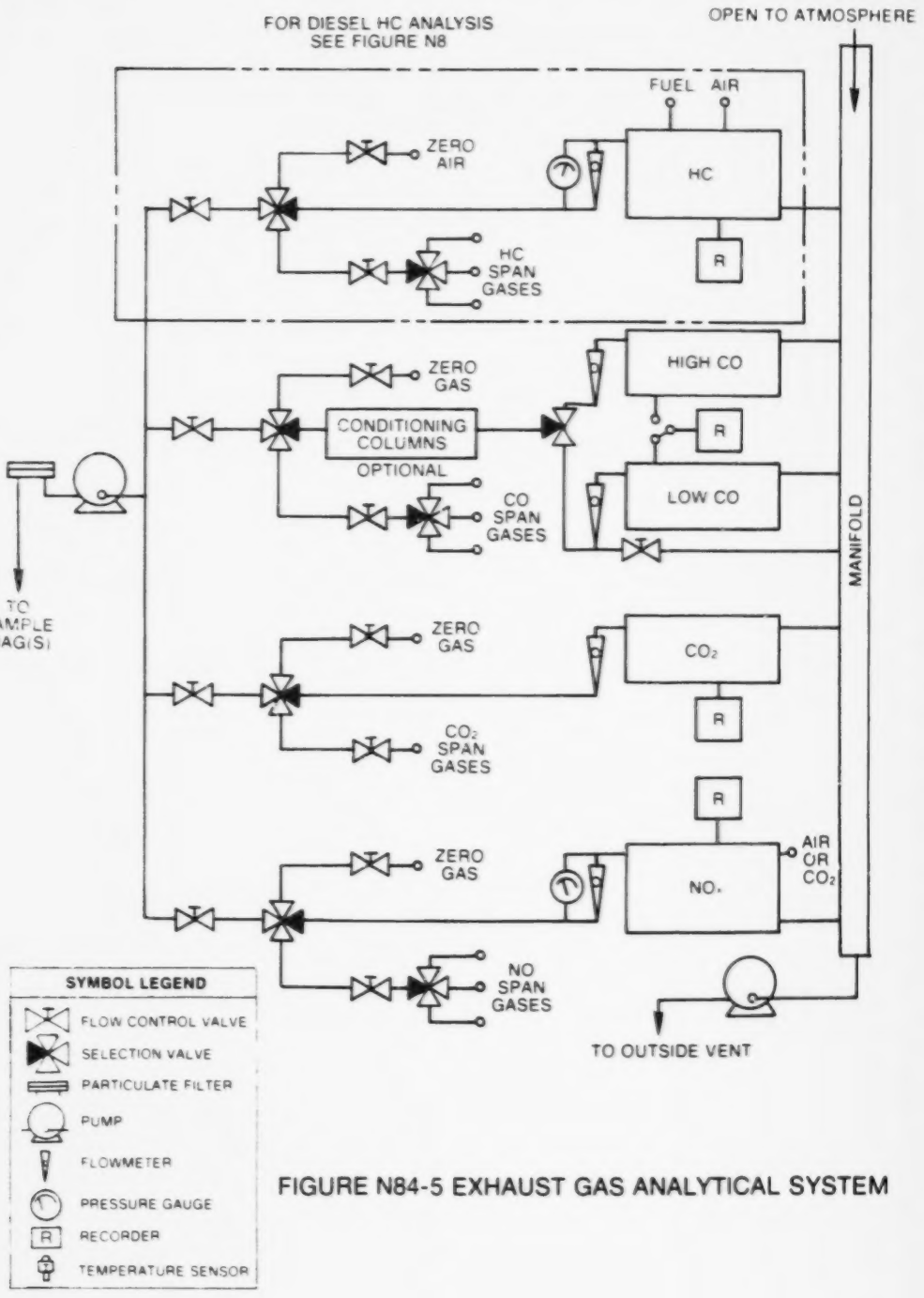

FIGURE N84-5 EXHAUST GAS ANALYTICAL SYSTEM

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(2) The carbon monoxide (NDIR) analyzer may require a sample conditioning column containing $CaSO_4$, or indicating silica gel to remove water vapor and containing ascarite to remove carbon dioxide from the CO analysis stream.

(i) If CO instruments are used which are essentially free of CO_2 and water vapor interference, the use of the conditioning column may be deleted. (See § 86.1322-84 and § 86.1342-84.)

(ii) A CO instrument will be considered to be essentially free of CO_2 and water vapor interference if its response to a mixture of 3 percent CO_2 in N_2 which has been bubbled through water at room temperature produces an equivalent CO response, as measured on the most sensitive CO range, which is less than 1 percent of full scale CO concentration on ranges above 300 ppm full scale or less than 3 ppm on ranges below 300 ppm full scale. (See § 86.1322-84.)

(c) *Alternate analytical systems.* Analysis systems meeting the specifications of 40 CFR 86, Subpart D may be used for testing this Subpart (N) with the exception of §§ 86.346-79 and 86.347-79, provided that the Subpart D systems meet the specifications of this Subpart. Heated analyzers may be used in their heated configuration.

(d) *Other analyzers and equipment.* Other types of analyzers and equipment may be used if shown to yield equivalent results and if approved in advance by the Administrator.

§ 86.1312-84 [Reserved]

§ 86.1313-84 Fuel specifications.

(a) *Gasoline.* (1) Gasoline having the following specifications will be used by the Adminstrator in exhaust emission testing. Gasoline having the following specifications or substantially equivalent specifications approved by the Administrator, shall be used by the manufacturer in exhaust testing, except that the lead and octane specifications do not apply.

Item	ASTM	Leaded	Unleaded
Octane, research, minimum	D2699	98	93
Pb (organic), gm/U.S. gallon		[1]1.4	0.00-0.05
Distillation range:			
IBP, F	D86	75-95	75-95
10 percent point, F	D86	120-135	120-135
50 percent point, F	D86	200-230	200-230
90 percent point, F	D86	300-325	300-325
EP, F (maximum)	D86	415	415
Sulphur, weight percent, (max)	D1266	0.10	0.10
Phosphorus, gm/U.S. gallon (max)		0.01	0.005
RVP, psi	D323	8.7-9.2	8.7-9.2
Hydrocarbon composition:			
Olefins, percent, (max)	D1319	10	10
Aeromatics, percent (max)	D1319	35	35
Saturates	D1319	(2)	(2)

[1]Minimum.
[2]Remainder.

(2) Gasoline representative of commercial gasoline which will be generally available through retail outlets shall be used in service accumulation. For leaded fuel the minimum lead content shall be equal to the average lead content found in regular leaded gasoline in the fuel survey prescribed by the Administrator. Where the Administrator determines that vehicles represented by a test vehicle will be operated using gasoline of different lead content than that prescribed in this paragraph, he may consent in writing to use of a gasoline with a different lead content. The octane rating of the gasoline used shall be not higher than 1.0 Research octane number above the minimum recommended by the manufacturer and have a minimum sensitivity of 7.5 octane numbers for unleaded fuel and 7.0 octane numbers for leaded fuel, where sensitivity is defined as the Research octane number minus the Motor octane number. The Reid Vapor Pressure of the gasoline used shall be characteristic of the motor

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fuel used during the season in which the service accumulation takes place.

(3) The specification range of the gasoline to be used under paragraph (a)(2) of this section shall be reported in accordance with § 86.084-21(b)(3).

(b) *Diesel fuel.* (1) The diesel fuels employed for testing shall be clean and bright, with pour and cloud points adequate for operability. The diesel fuel may contain nonmetallic additives as follows: Cetane improver, metal deactivator, antioxidant, dehazer, antirust, pour depressant, dye, and dispersant.

(2) Diesel fuel meeting the following specifications, or substantially equivalent specifications approved by the Administrator, shall be used in exhaust emissions testing. The grade of diesel fuel recommended by the engine manufacturer commercially designated as "Type 1-D" or "Type 2-D" grade diesel fuel shall be used.

Item	ASTM	Type 1-D	Type 2-D
Cetane	D613	48-54	42-50
Distillation range:			
IBP, F	D86	330-390	340-400
10 percent point, F	D86	370-430	400-460
50 percent point, F	D86	410-480	470-540
90 percent point, F	D86	460-520	550-610
EP, F	D86	500-560	580-660
Gravity, API	D287	40-44	33-37
Total sulfur, percent	D129 or D2622	0.05-0.20	0.2-0.5
Hydrocarbon composition:			
Aromatics, percent	D1319	[1]8	[1]27
Paraffins, naphthenes, Olefins	D1319	([1])	([1])
Flashpoint, F (minimum)	D93	120	130
Viscosity, centistokes	D445	1.6-2.0	2.0-3.2

[1]Minimum.

(3) Diesel fuel meeting the following specifications, or substantially equivalent specifications approved by the Administrator, shall be used in service accumulation. The grade of diesel fuel recommended by the engine manufacturer, commercially designated as "Type 1-D" or "Type 2-D" grade diesel fuel shall be used.

Item	ASTM	Type 1-D	Type 2-D
Cetane (minimum)	D613	42-56	30-58
Distillation range:			
90 percent point, F	D86	440-530	540-630
Gravity, APM	D287	39-45	30-42
Total sulfur, percent (minimum)	D129 or D2622	[1]0.05	0.2
Flashpoint, F (minimum)	D93	120	130
Viscosity, centistokes	D455	1.2-2.2	1.5-4.5

[1]Minimum.

(4) Other petroleum distillate fuels may be used for testing and service accumulation provided they are:

(i) Commercially available;

(ii) Information, acceptable to the Administrator, is provided to show that only the designated fuel would be used in customer service;

(iii) Use of a fuel listed under paragraphs (b)(2) and (b)(3) of this section would have a detrimental effect on emissions or durability;

(iv) Written approval from the Administrator of the fuel specifications must be provided prior to the start of testing.

(5) The specification range of the fuels to be used under paragraphs (b)(2), (b)(3), and (b)(4) of this section shall be reported in accordance with § 86.084-21(b)(3).

[45 FR 4181, Jan. 21, 1980, amended at 46 FR 50497, Oct. 13, 1981]

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§ 86.1314-84 Analytical gases.

(a) *Analyzer gases.*

(1) Gases for the CO and CO_2 analyzers shall be single blends of CO and CO_2 respectively using nitrogen as the diluent.

(2) Gases for the hydrocarbon analyzer shall be single blends of propane using air as the diluent.

(3) Gases for the NO_x analyzer shall be single blends of NO named as NO_x with a maximum NO_2 concentration of 5 percent of the nominal value using nitrogen as the diluent.

(4) Fuel for the FID shall be a blend of 40 ± 2 percent hydrogen with the balance being helium. The mixture shall contain less than 1 ppm equivalent carbon response. 98 to 100% hydrogen fuel may be used with advance approval of the Administrator.

(5) The allowable zero gas (air or nitrogen) impurity concentrations shall not exceed 1 ppm equivalent carbon response, 1 ppm carbon monoxide, 0.04 percent (400 ppm) carbon dioxide and 0.1 ppm nitric oxide.

(6)(i) "Zero-grade air" includes artificial "air" consisting of a blend of nitrogen and oxygen with oxygen concentrations between 18 and 21 mole percent.

(ii) Calibration gases shall be traceable to within 1 percent of NBS gas standards, or other gas standards which have been approved by the Administrator.

(iii) Span gases shall be accurate to within 2 percent of true concentration, where true concentration refers to NBS gas standards, or other gas standards which have been approved by the Administrator.

(7) The use of proportioning and precision blending devices to obtain the required gas concentrations is allowable provided their use has been approved in advance by the Administrator.

§ 86.1315-84 [Reserved]

§ 86.1316-84 Calibrations; frequency and overview.

(a) Calibrations shall be performed as specified in §§ 86.1318-84 through 86.1326-84.

(b) At least monthly or after any maintenance which could alter calibration, the following calibrations and checks shall be performed:

(1) Calibrate the hydrocarbon analyzer, carbon dioxide analyzer, carbon monoxide analyzer, and oxides of nitrogen analyzer.

(2) Calibrate the engine dynamometer flywheel torque and speed measurement transducers.

(3) Calibrate the engine flywheel torque and speed feedback signals.

(c) At least weekly or after any maintenance which could alter calibration, the following calibrations and checks shall be performed:

(1) Check the oxides of nitrogen converter efficiency, and;

(2) Perform a CVS system verification.

(d) The CVS positive displacement pump or critical flow venturi shall be calibrated following initial installation, major maintenance or as necessary when indicated by the CVS system verification (described in § 86.1319-84).

(e) Sample conditioning columns, if used in the CO analyzer train, should be checked at a frequency consistent with observed column life or when the indicator of the column packing begins to show deterioration.

§ 86.1317-84 [Reserved]

§ 86.1318-84 Engine dynamometer calibrations.

(a) The engine flywheel torque and engine speed measurement transducers shall be calibrated at least once each month with the calibration equipment described in § 86.1308-84.

(b) The engine flywheel torque and speed feedback signal shall be calibrated at least once each month.

(c) Other engine dynamometer system calibrations shall be performed as dictated by good engineering practice and manufacturer's recommendations.

(d) When calibrating the engine flywheel torque transducer, any lever arm used to convert a weight or a force through a distance into a torque shall be used in a horizontal position ($\pm 5°$).

(e) Calibrated resistors may not be used for engine flywheel torque transducer calibration, but may be used to

span the transducer prior to engine testing.

§ 86.1319-84 CVS calibration.

(a) The CVS is calibrated using an accurate flowmeter and restrictor valve. The calibrated accuracy of the flowmeter shall be traceable to the National Bureau of Standards to within 1 percent of the true flow value.

NOTE: In no case should an upstream screen or other restriction which can affect the flow be used ahead of the flowmeter unless calibrated throughout the flow range with such a device.

The CVS calibration procedures are designed for use of a "metering venturi" type flowmeter. Properly calibrated large radius or ASME flow nozzles are considered equivalent if traceable to NBS measurements. Other measurement systems may be used if shown to be equivalent under the test conditions in this action and if approved by the Administrator. Measurements of the various flowmeter parameters are recorded and related to flow through the CVS. Procedures used by EPA for both PDP- and CFV-CVS's are outlined below. Other procedures yielding equivalent results may be used if approved in advance by the Administrator.

(b) After the calibration curve has been obtained, verification of the entire system may be performed by injecting a known mass of gas into the system and comparing the mass indicated by the system to the true mass injected. An indicated error does not necessarily mean that the calibration is wrong, since other factors can influence the accuracy of the system, e.g. analyzer calibration or HC hangup. A verification procedure is found in paragraph (e) of this section.

(c) PDP calibration.

(1) The following calibration procedure outlines the equipment, the test configuration, and the various parameters which must be measured to establish the flow rate of the CVS pump.

(i) All the parameters related to the pump are simultaneously measured with the parameters related to a flowmeter which is connected in series with the pump.

(ii) The calculated flow rate, $ft^3/min.$, (at pump inlet absolute pressure and temperature) can then be plotted versus a correlation function which is the value of a specific combination of pump parameters.

(iii) The linear equation which relates the pumpflow and the correlation function is then determined.

(iv) In the event that a CVS has a multiple speed drive, a calibration for each range used must be performed.

(2) This calibration procedure is based on the measurement of the absolute values of the pump and flowmeter parameters that relate the flow rate at each point. Three conditions must be maintained to assure the accuracy and integrity of the calibration curve:

(i) The pump pressures should be measured at taps on the pump rather than at the external piping on the pump inlet and outlet. (Pressure taps that are mounted at the top center and bottom center of the pump drive headplate are exposed to the actual pump cavity pressure, and therefore reflect the absolute pressure differentials.)

(ii) The temperature stability must be maintained during calibration. (Flowmeters are sensitive to inlet temperature oscillations which cause the data points to be scattered. Gradual changes in temperature are acceptable as long as they occur over a period of several minutes.)

(iii) All connections between the flowmeter and the CVS pump must be absolutely void of any leakage.

(3) During an exhaust emission test the measurement of these same pump parameters enables the user to calculate the flow rate from the calibration equation.

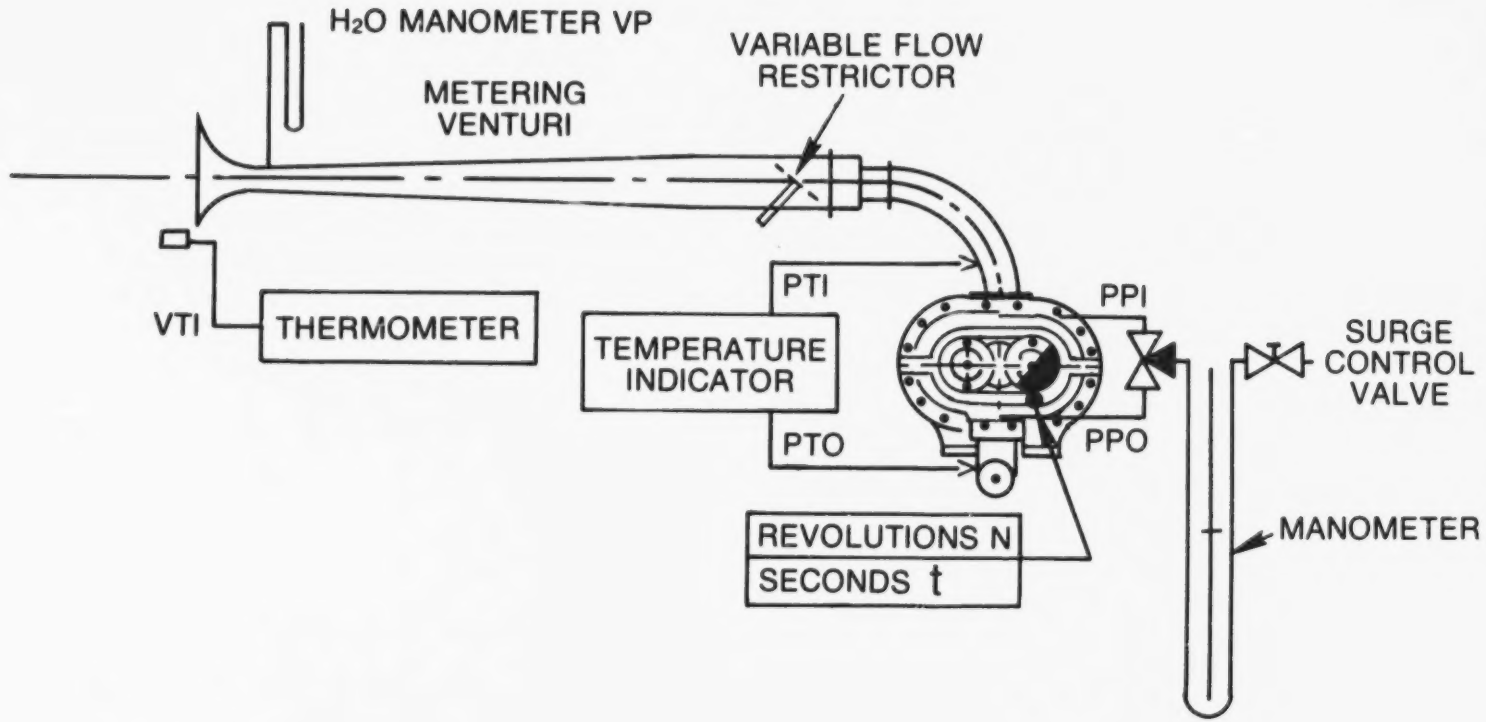

FIGURE N84-6 — PDP-CVS CALIBRATION CONFIGURATION

(4) Connect a system as shown in Figure N84-6. Although particular types of equipment are shown, other configurations that yield equivalent results may be used if approved in advance by the Administrator. For the system indicated, the following data with given accuracy are required:

CALIBRATION DATA MEASUREMENTS

Parameter	Symbol	Units	Tolerances
Barometric pressure (corrected)	P_B	In. Hg (kPa)	± .01 in. Hg (± .034 kPa)
Ambient temperature	T_A	F (C)	± 5 F (± 28 C)
Air temperature into SFV	ETI	F (C)	± 50 F (± 28 C)
Pressure drop between SFV inlet and throat	EDP	In. H_2C (kPa)	± .05 in. H_2O (± .012 kPa)
Air temperature at CVS pump inlet	PTI	F (C)	± 5 F (± 28 C)
Pressure depression at CVS pump inlet	PPI	In. fluid (kPa)	± .05 in. fluid (± .022 kPa)
Specific gravity of manometer fluid (1.75 oil)	Sp. G		
Pressure head at CVS pump outlet	PPO	In. fluid (kPa)	± .05 in. fluid (± .022 kPa)
Air temperature at CVS pump outlet (optional)	PTO	F (C)	± 5 F (± 28 C)
Pump revolutions during test period	N	Revs	± 1 Rev
Elapsed time for test period	t	s	± .05 s

(5) After the system has been connected as shown in Figure N84-6, set the variable restrictor in the wide open position and run the CVS pump for 20 minutes. Record the calibration data.

(6) Reset the restrictor valve to a more restricted condition in an increment of pump inlet depression that will yield a minimum of six data points for the total calibration. Allow the system to stabilize for 3 minutes and repeat the data acquisition.

(7) *Data analysis:*

(i) The air flow rate, Qs, at each test point is calculated in standard cubic feet per minute (68° F, 29.92" HG) from the flowmeter data using the manufacturer's prescribed method.

(ii) The air flow rate is then converted to pump flow, V_o, in cubic feet per revolution at absolute pump inlet temperature and pressure.

$$V_o = \frac{Qs}{n} \times \frac{T_p}{528} \times \frac{29.92}{P_p}$$

Where:

V_o = Pump flow, ft³/revolution (m³/revolution) at T_p, P_p.

Qs = Meter air flow rate in standard cubic feet per minute, standard conditions are 68 F, 29.92 in. Hg (20 C, 101.3 kPa.)

n = Pump speed in revolutions per minute.

T_p = Pump inlet temperature R(K)

= PTI + 460 (R), or

= PTI + 273 (K).

P_p = Absolute pump inlet pressure, in. Hg (kPa)

= P_B − #PPI (Sp. Gr./13.57) for SI units, $P_p = P_B - PPI$

Where:

P_B = barometric pressure, in. Hg (kPa).

PPI = Pump inlet depression, in. fluid (kPa).

Sp. Gr. = Specific gravity of manometer fluid relative to water.

(iii) The correlation function at each test point is then calculated from the calibration data.

$$X_o = \frac{1}{n}\sqrt{\frac{\Delta p_p}{P_e}}$$

Where:

x_o = correlation function.

Δp_p = The pressure differential from pump inlet to pump outlet, in. Hg (kPa).

= $P_e - P_p$

P_e = Absolute pump outlet pressure, in. Hg (kPa)

= P_B + PPO (Sp. Gr./13.57) for SI units, $P_e = P_B + PPO$

(d) *CFV calibration.* (1) Calibration of the CFV is based upon the flow equation for a critical venturi. Gas flow is a function of inlet pressure and temperature:

$$Q_s = \sqrt{\frac{K_v P}{T}}$$

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Where:
Q_v = flow,
K_v = calibration coefficient,
P = absolute pressure,
T = absolute temperature.

The calibration procedure described below establishes the value of the calibration coefficient at measured values of pressure, temperature and air flow.

(2) The manufacturer's recommended procedure shall be followed for calibrating electronic portions of the CFV.

(3) Measurements necessary for flow calibration are as follows:

CALIBRATION DATA MEASUREMENTS

Parameter	Symbol	Units	Tolerances
Barometric pressure (corrected)	P_B	In. Hg (kPa)	±.01 in. Hg (±.034 kPa).
Air temperature, flowmeter	ETI	°F (°C)	±.50°F (±.28°C).
Pressure drop between SFV inlet and throat	EDP	In. H_2O (kPa)	±.05 in. H_2O (±.012 kPa).
Air flow	Q_v	Ft³/min. (m³/min.)	±.5%.
CFV inlet depression	PPI	In. fluid (kPa)	±.05 in. fluid (±.022 kPa).
Temperature at venturi inlet	T_v	°F (°C)	±.5°F (±.28°C).
Specific gravity of manometer fluid (1.75 oil)	Sp. Gr.		

(4) Set up equipment as shown in Figure N84-7 and check for leaks. Any leaks between the flow measuring devices and the critical flow venturi will seriously affect the accuracy of the calibration.

(5) Set the variable flow restrictor to the open position, start the blower, and allow the system to stabilize. Record data from all instruments.

(6) Vary the flow restrictor and make at least 8 readings across the critical flow range of the venturi.

(7) *Data analysis.* The data recorded during the calibration are to be used in the following calculations:

(i) The air flow rate, Q_s, at each test point is calculated in standard cubic feet per minute from the flow meter data using the manufacturer's prescribed method.

(ii) Calculate values of the calibration coefficient for each test point:

$$K_v = \frac{Q_s \sqrt{T_v}}{P_v}$$

Where:
Q_s = Flow rate in standard cubic feet per minute, standard conditions are 68° F, 29.92 in. Hg (20° C, 101.3 kPa).
T_v = Temperature at venturi inlet, R(K).
P_v = Pressure at venturi inlet, mm Hg (kPa). = P_B − PPI (Sp. Gr./13.57).
for SI units: $P_v = P_B - PPI$.
Where:
PPI = Venturi inlet pressure depression, in. fluid (kPa).
Sp. Gr. = Specific gravity of manometer fluid, relative to water.

(iii) Plot K_v as a function of venturi inlet pressure. For sonic flow, K_v will have a relatively constant value. As pressure decreases (vacuum increases), the venturi becomes unchoked and K_v decreases. See Figure N84-8.

(iv) For a minimum of 8 points in the critical region calculate an average K_v and the standard deviation.

(v) If the standard deviation exceeds 0.3 percent of the average K_v take corrective action.

(e) *CVS system verification.* The following "gravimetric" technique can be used to verify that the CVS and analytical instruments can accurately measure a mass of gas that has been injected into the system. (Verification can also be accomplished by constant flow metering using critical flow orifice devices.)

(1) Obtain a small cylinder that has been charged with pure propane or carbon monoxide gas (caution—carbon monoxide is poisonous).

(2) Determine a reference cylinder weight to the nearest 0.01 grams.

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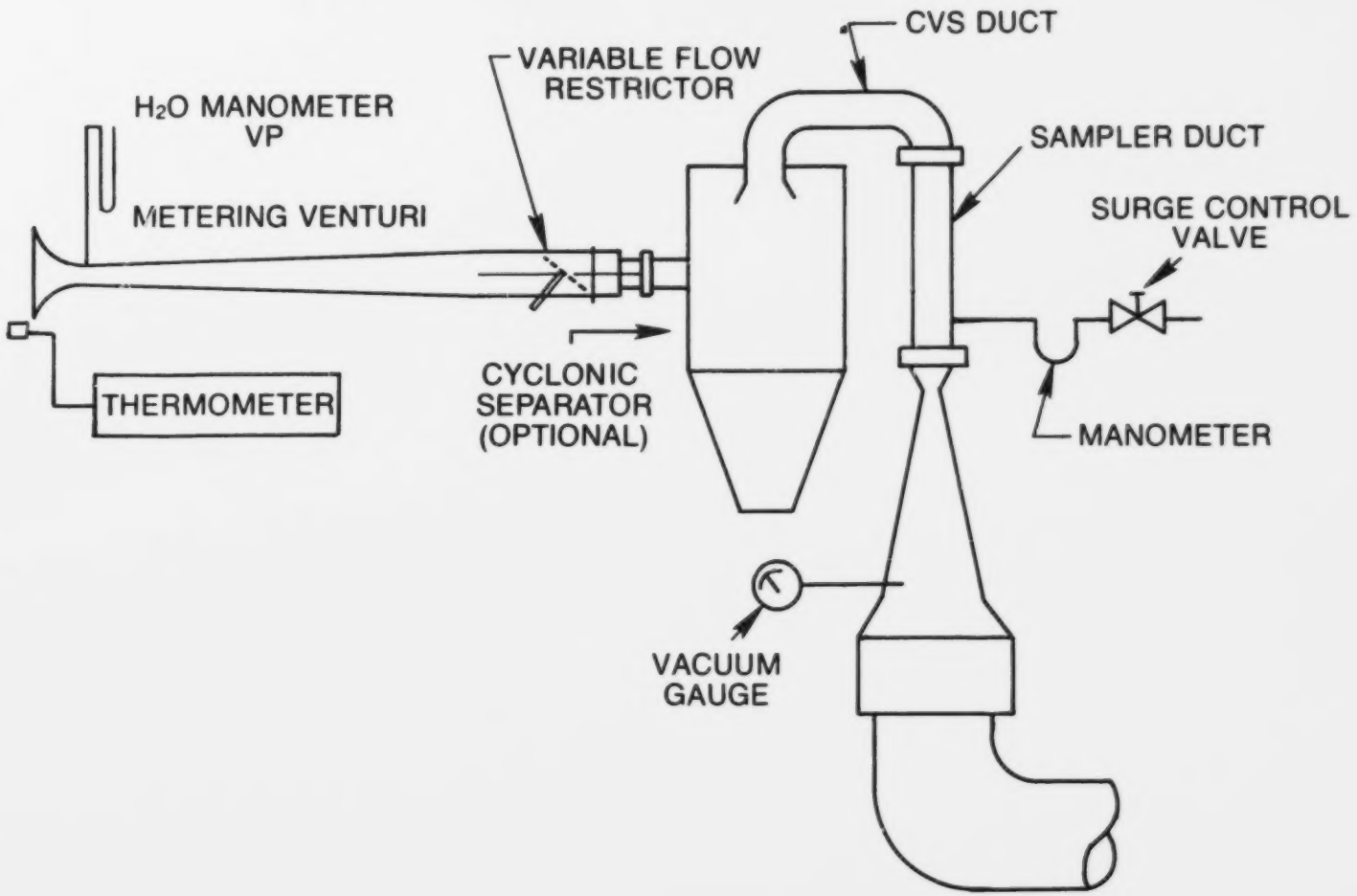

FIGURE N84-7 — CFV-CVS CALIBRATION CONFIGURATION

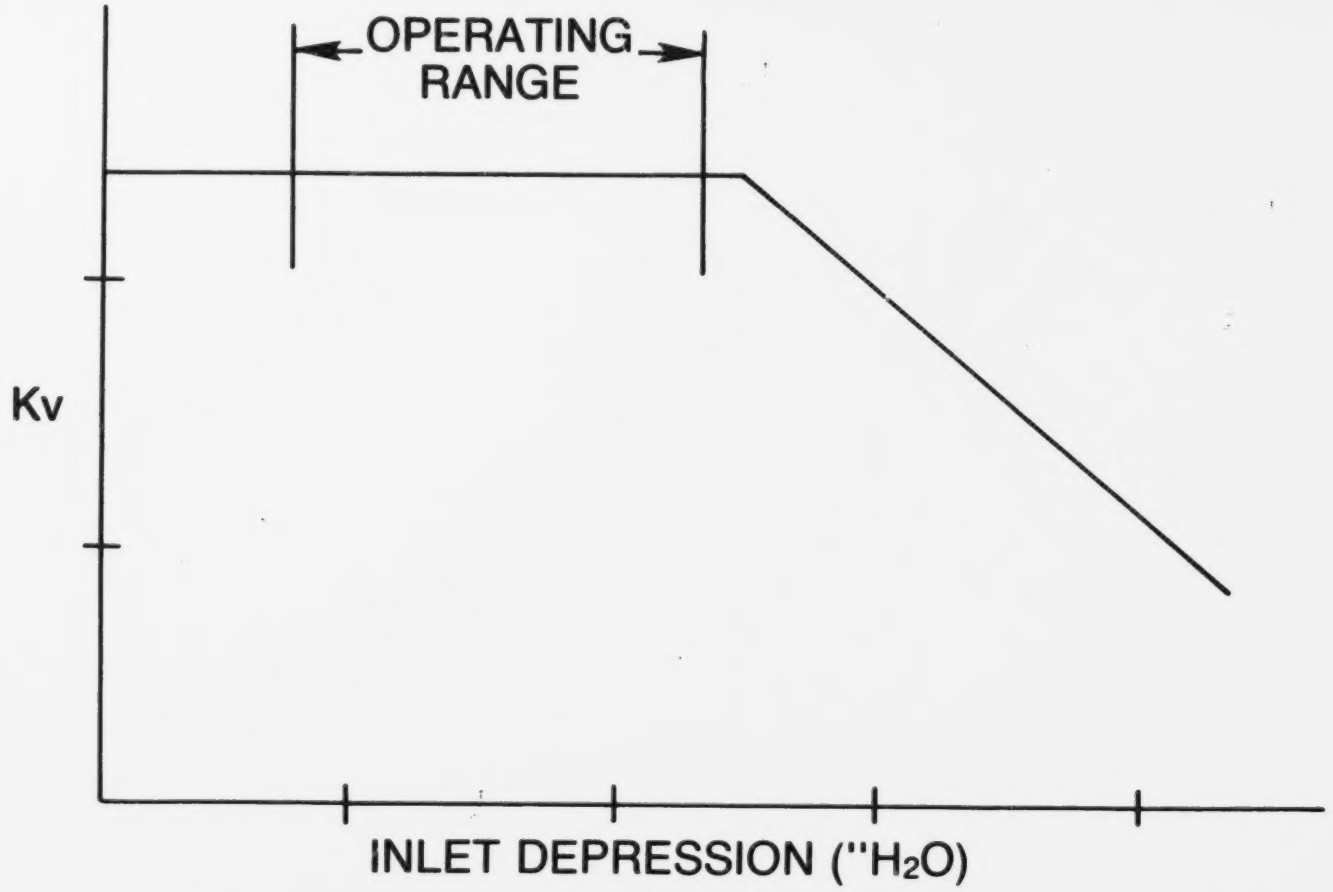

FIGURE N84-8— SONIC FLOW CHOKING

(3) Operate the CVS in the normal manner and release a quantity of pure propane or carbon monoxide into the system during the sampling period (approximately 5 minutes).

(4) The calculations of § 86.1342 are performed in the normal way except in the case of propane. The density of propane (17.56 g/ft³/carbon atom (0.6201 kg/m³/carbon atom)) is used in place of the density of exhaust hydrocarbons. In the case of carbon monoxide, the density of 32.97 g/ft³ (1.164 kg/m³) is used.

(5) The gravimetric mass is subtracted from the CVS measured mass and then divided by the gravimetric mass to determine the percent accuracy of the system.

(6) Good engineering practice requires that the cause for any discrepancy greater than ±2 percent must be found and corrected.

§ 86.1320-84 [Reserved]

§ 86.1321-84 Hydrocarbon analyzer calibration.

The FID hydrocarbon analyzer shall receive the following initial and periodic calibration. The HFID shall be operated to a set point ±10°F (±5.5°C) between 365 and 385°F (185 and 197°C).

(a) Initial and periodic optimization of detector response. Prior to its introduction into service and at least annually thereafter the FID hydrocarbon analyzer shall be adjusted for optimum hydrocarbon response. Alternate methods yielding equivalent results may be used, if approved in advance by the Administrator.

(1) Follow the manufacturer's instructions for initial instrument start-up and basic operating adjustment using the appropriate fuel (see § 86.1314-84 and zero-grade air.

(2) Optimize on the most common operating range. Introduce into the analyzer, a propane in air mixture with a propane concentration equal to approximately 90% of the most common operating range.

(3) One of the following procedures is required for FID or HFID optimization.

(i) The procedures outlined in Society of Automotive Engineers (SAE) paper No. 770141, "Optimization of Flame Ionization Detector for Determination of Hydrocarbons in Diluted Automobile Exhaust"; author, Glenn D. Reschke.

(ii) The HFID optimization procedures outlined in 40 CFR Part 86, Subpart D.

(iii) Alternate procedures are allowed, if approved in advance by the Administrator.

(4) After the optimum flow rates have been determined, they are recorded for future reference.

(b) Initial and periodic calibration. Prior to its introduction into service and monthly thereafter the FID or HFID hydrocarbon analyzer shall be calibrated on all normally used instrument ranges. Use the same flow rate as when analyzing samples.

(1) Adjust analyzer to optimize performance.

(2) Zero the hydrocarbon analyzer with zero-grade air.

(3) Calibrate on each used operating range with propane in air calibration gases having nominal concentrations of 15, 30, 45, 60, 75 and 90 percent of that range. For each range calibrated, if the deviation from a least-squares best-fit straight line is 2% or less of the value at each data point, concentration values may be calculated by use of a single calibration factor for that range. If the deviation exceeds 2% at any point, the best-fit non-linear equation which represent the data to within 2% of each test point shall be used to determine concentration.

§ 86.1322-84 Carbon monoxide analyzer calibration.

The NDIR carbon monoxide analyzer shall receive the following initial and periodic calibrations:

(a) Initial and periodic interference check. Prior to its introduction into service and annually thereafter the NDIR carbon monoxide analyzer shall be checked for response to water vapor and CO_2:

(1) Follow the manufacturer's instructions for instrument start-up and operation. Adjust the analyzer to optimize performance on the most sensitive range to be used.

(2) Zero the carbon monoxide analyzer with either zero-grade air or zero-grade nitrogen.

(3) Bubble a mixture of 3 percent CO_2 in N_2 through water at room temperature and record analyzer response.

(4) An analyzer response of more than 1 percent of full scale for ranges above 300 ppm full scale or more than 3 ppm on ranges below 300 ppm full scale will require corrective action. (Use of conditioning columns is one form of corrective action which may be taken.)

(b) Initial and periodic calibration. Prior to its introduction into service and monthly thereafter the NDIR carbon monoxide analyzer shall be calibrated.

(1) Adjust the analyzer to optimize performance.

(2) Zero the carbon monoxide analyzer with either zero-grade air or zero-grade nitrogen.

(3) Calibrate on each used operating range with carbon monoxide in N_2 calibration gases having nominal concentrations of 15, 30, 45, 60, 75, and 90 percent of that range. Additional calibration points may be generated. For each range calibrated, if the deviation from a least-squares best-fit straight line is 2 percent of less of the value at each data point, concentration values may be calculated by use of a single calibration factor for that range. If the deviation exceeds 2 percent at any point, the best-fit non-linear equation which represents the data to within 2% of each test point shall be used to determine concentration.

(c) The initial and periodic interference, system check, and calibration test procedures specified in 40 CFR Part 86 may be used in lieu of the procedures specified in this section.

§ 86.1323-84 Oxides of nitrogen analyzer calibration.

The chemiluminescent oxides of nitrogen analyzer shall receive the following initial and periodic calibration.

(a) Prior to its introduction into service and weekly thereafter the chemiluminescent oxides of nitrogen analyzer shall be checked for NO_2 to NO converter efficiency. Figure N84-9 is a reference for the following paragraphs:

(1) Follow the manufacturer's instructions for instrument start-up and operation. Adjust the analyzer to optimize performance.

(2) Zero the oxides of nitrogen analyzer with zero-grade air or zero-grade nitrogen.

(3) Connect the outlet of the NO_x generator to the sample inlet of the oxides of nitrogen analyzer which has been set to the most common operating range.

(4) Introduce into the NO_x generator analyzer-system an NO in nitrogen (N_2) mixture with a NO concentration equal to approximately 80 percent of the most common operating range. The NO_2 content of the gas mixture shall be less than 5 percent of the NO concentration.

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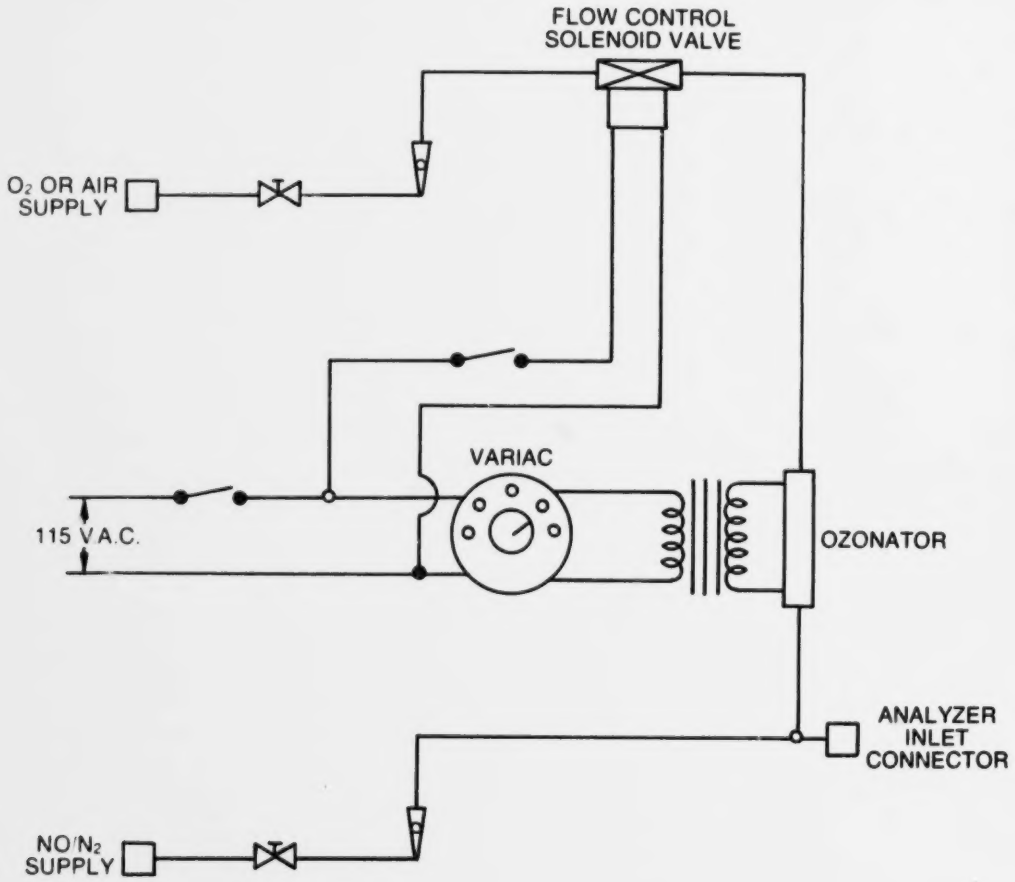

(SEE FIG. N84-5 FOR SYMBOL LEGEND)

FIGURE N84-9 — NO_x CONVERTER EFFICIENCY DETECTOR

(5) With the oxides of nitrogen analyzer in the NO mode, record the concentration of NO indicated by the analyzer.

(6) Turn on the NO_x generator O_2 (or air) supply and adjust the O_2 (or air) flow rate so that the NO indicated by the analyzer is about 10 percent less than indicated in paragraph (a)(5) of this section. Record the concentration of NO in this $NO + O_2$ mixture.

(7) Switch the NO_x generator to the generation mode and adjust the generation rate so that the NO measured on the analyzer is 20 percent of that measured in paragraph (a)(5) of this section. There must be at least 10 percent unreacted NO at this point. Record the concentration of residual NO.

(8) Switch the oxides of nitrogen analyzer to the NO_x mode and measure total NO_x. Record this value.

(9) Switch off the NO_x generator but maintain gas flow through the system. The oxides of nitrogen analyzer will indicate the NO_x in the $NO + O_2$ mixture. Record this value.

(10) Turn of the NO_x generator O_2 (or air) supply. The analyzer will now indicate the NO_x in the original NO in N_2 mixture. This value should be no more than 5 percent above the value

indicated in paragraph (a)(4) of this section.

(11) Calculate the efficiency of the NO_x converter by substituting the concentrations obtained into the following equation:

$$\text{Percent efficiency} = \left[1 + \frac{a-b}{c-d}\right] \times 100$$

Where:

a = concentration obtained in paragraph (a)(8),
b = concentration obtained in paragraph (a)(9),
c = concentration obtained in paragraph (a)(6),
d = concentration obtained in paragraph (a)(7).

If converter efficiency is not greater than 90% corrective action will be required.

(b) *Initial and periodic calibration.* Prior to its introduction into service and monthly thereafter the chemiluminescent oxides of nitrogen analyzer shall be calibrated on all normally used instrument ranges. Use the same flow rate as when analyzing samples. Proceed as follows:

(1) Adjust analyzer to optimize performance.

(2) Zero the oxides of nitrogen analyzer with zero-grade air or zero-grade nitrogen.

(3) Calibrate on each normally used operating range with NO in N_2 calibration gases with nominal concentrations of 15, 30, 45, 60, 75 and 90 percent of that range. For each range calibrated, if the deviation from a least-squares best-fit straight line is 2% or less of the value at each data point, concentration values may be calculated by use of a single calibration factor for that range. If the deviation exceeds 2% at any point, the best-fit non-linear equation which represents the data to within 2% of each test point shall be used to determine concentration.

(c) The initial and periodic interferences, system check, and calibration test procedures specified in 40 CFR Part 86 may be used in lieu of the procedures specified in this section.

§ 86.1324-84 Carbon dioxide analyzer calibration.

Prior to its introduction into service and monthly thereafter the NDIR carbon dioxide analyzer shall be calibrated as follows:

(a) Follow the manufacturer's instructions for instrument start-up and operation. Adjust the analyzer to optimize performance.

(b) Zero the carbon dioxide analyzer with either zero-grade air or zero-grade nitrogen.

(c) Calibrate on each normally used operating range with carbon dioxide in N_2 calibration gases having nominal concentrations of 15, 30, 45, 60, 75, and 90 percent of that range. Additional calibration points may be generated. For each range calibrated, if the deviation from a least-squares best-fit straight line is 2 percent of less of the value at each data point, concentration values may be calculated by use of a single calibration factor for that range. If the deviation exceeds 2 percent at any point, the best-fit non-linear equation which represents the data to within 2% of each test point shall be used to determine concentration.

(d) The initial and periodic interferences, system check, and calibration test procedures specified in 40 CFR Part 86 may used in lieu of the procedures in this section.

§ 86.1325-84 [Reserved]

§ 86.1326-84 Calibration of other equipment.

Other test equipment used for testing shall be calibrated as often as required by the manufacturer or as necessary according to good practice.

§ 86.1327-84 Engine dynamometer test procedures; overview.

(a) The engine dynamometer test procedure is designed to determine the brake-specific emissions of hydrocarbons, carbon monoxide, and oxides of nitrogen. The test procedure consists of a "cold" start test following either natural or forced cool-down periods described in § 86.1334-84 and § 86.1335-84 respectively. A "hot" start test follows the "cold" start test after

a hot soak of 20 minutes. The idle test of Subpart P may be run after the "hot" start test. The exhaust emissions are diluted with ambient air and a continuous proportional sample is collected for analysis during the cold and hot start tests. The composite samples collected are analyzed either in bags or continuously for hydrocarbons (HC), carbon monoxide (CO), carbon dioxide (CO_2), and oxides of nitrogen (NO_x). A parallel sample of the dilution air is similarly analyzed for hydrocarbon, carbon monoxide, carbon dioxide, and oxides of nitrogen.

(b) Engine torque and rpm shall be recorded continuously during both the cold and hot start tests. Data points shall be recorded at least once every second.

(c) Using the torque and rpm feedback signals, the brake horsepower is integrated with respect to time for the cold and hot cycles. This produces a brake horsepower-hour value that enables the brake-specific emissions to be determined (see § 86.1342-84, Calculations; exhaust emissions).

(d)(1) When an engine is tested for exhaust emissions or is operated for service accumulation on an engine dynamometer, the complete engine shall be tested, with all emission control devices installed and functioning.

(2) Evaporative emission controls need not be connected if data are provided to show that normal operating conditions are maintained in the engine induction system.

(3) On air cooled engines, the fan shall be installed.

(4) Additional accessories (e.g., oil cooler, alternators, air compressors, etc.) may be installed with advance approval by the Administrator.

(5) The engine must be equipped with a production type starter.

(e) Means of engine cooling which will maintain the engine operating temperatures (e.g., intake air, oil, water, etc.) at approximately the same temperature as specified by the manufacturer shall be used. Auxiliary fan(s) may be used to maintain engine cooling during operation on the dynamometer.

(f) *Exhaust system.* (1) A chassis-type exhaust system shall be used. The exhaust system shall meet the following requirements:

(i) For all catalyst systems, the distance from the exhaust manifold flange(s) to the catalyst shall be the same as in the vehicle configuration unless the manufacturer provides data showing equivalent performance at another location.

(ii) The exhaust back pressure or restriction shall be typical of those seen in the actual vehicle exhaust system configuration.

§§ 86.1328-84—86.1329-84 [Reserved]

§ 86.1330-84 Test sequence, general requirements.

(a) The test sequence shown in Figure N84-10 shows the major steps encountered as the test engine undergoes the procedures subsequently described.

(b) The average temperature of the engine intake air and CVS dilution air shall be maintained at 25° C±5° C (77° F±9° F) throughout the test sequence. Engines with auxiliary emission control devices which are temperature dependent (e.g., chokes, air cleaner, hot air doors, etc.) shall be tested at an average ambient test cell temperature of 25° C±5° C throughout the test sequence, except as noted in § 86.1335-84.

(c) No control of ambient or CVS dilution air humidity is required. Engine intake air humidity shall not exceed 90 grains of water per pound of dry air.

(d) The idle test of Subpart P may be run after completion of the hot start exhaust emission test, if applicable.

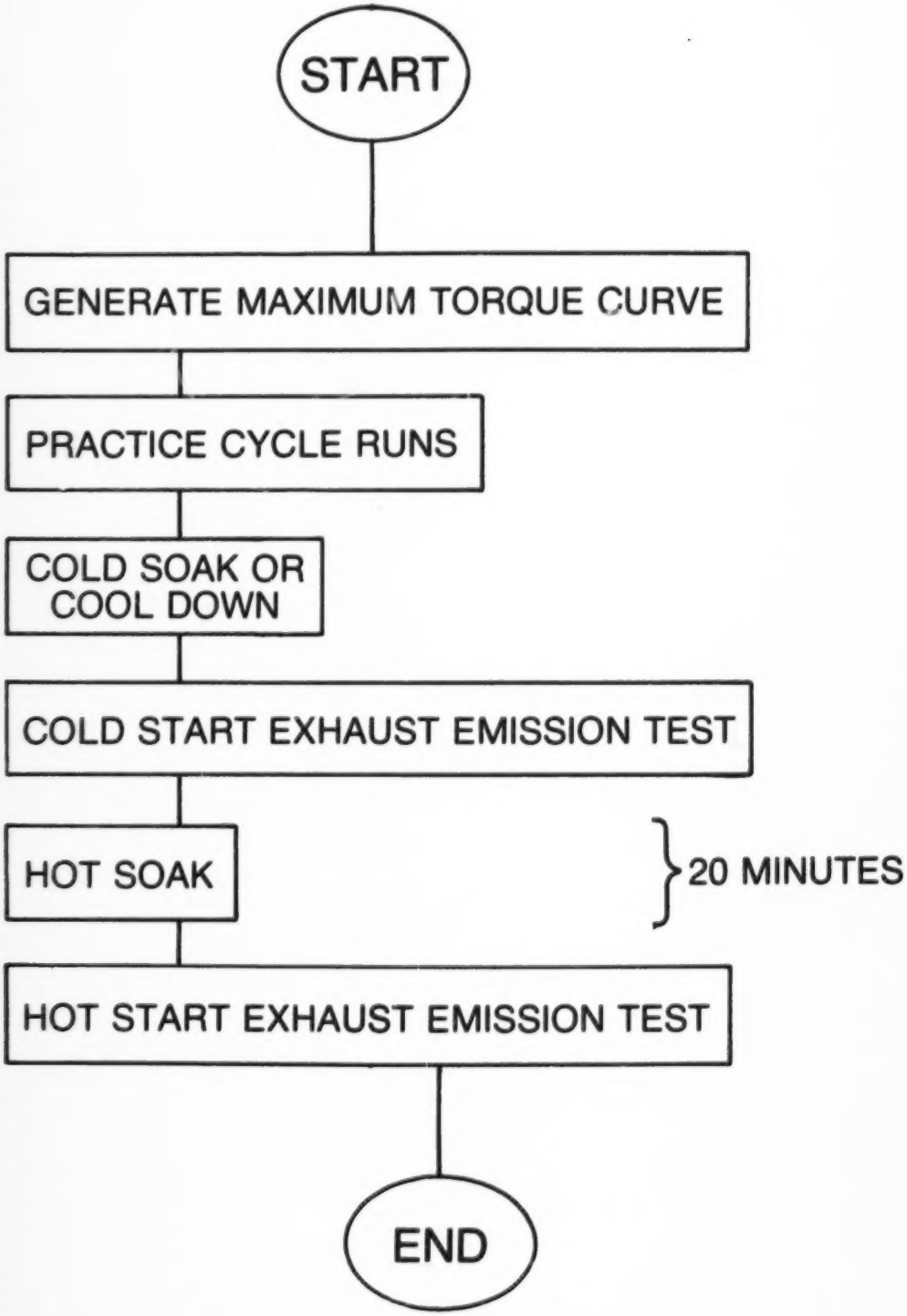

FIGURE N84-10— TEST SEQUENCE

(e) The barometric pressure observed during the generation of the maximum torque curve shall not deviate more than 1 in. Hg from the value measured at the beginning of the map. The barometric pressure observed during the exhaust emission test shall not deviate more than 1 in. Hg from the value measured at the beginning of the emission test. The average barometric pressure observed during the exhaust emission test must be within 1 in. Hg of the average observed during the maximum torque curve generation.

(f) *Diesel Engines only.* Air inlet and exhaust restrictions shall be set to represent the average restrictions which would be seen in use in a representative application. Inlet depression and exhaust backpressure shall be set with the engine operating at maximum horsepower.

§ 86.1331-84 [Reserved]

§ 86.1332-84 Engine mapping procedures.

(a) Mount test engine on the engine dynamometer.

(b) Determine minimum mapping speed.

(1) *Gasoline-fueled engines.* The minimum mapping speed shall be calculated from the following equations:

(i) Minimum Speed = Curb Idle RPM − 200 RPM; or

(ii) Minimum Speed = 400 RPM, whichever is greater.

(2) *Diesel-engines.* The minimum mapping speed shall be calculated from the following equations:

(i) Minimum Speed = Low Idle RPM − 200 RPM; or

(ii) Minimum Speed = 400 RPM, whichever is greater.

(c) Determine maximum mapping speed.

(1) *Gasoline-fueled.* (i) For ungoverned engines the maximum mapping speed shall be calculated from the following equations:

$$\text{Maximum Speed} = \text{Curb Idle RPM} + \frac{115\ (\text{Measured rated RPM} - \text{Curb Idle RPM})}{100}$$

(ii) For governed engines the maximum mapped speed shall be either that speed at which the wide open throttle torque drops off to zero, or the maximum speed as calculated for ungoverned engines, whichever is smaller.

(2) *Diesel-engines.* (i) For ungoverned engines the maximum mapping speed shall be calculated from the following equation:

$$\text{Maximum Speed} = \text{Curb Idle RPM} + \frac{113\ (\text{Measured rated RPM} - \text{Curb Idle RPM})}{100}$$

(ii) For governed engines the maximum mapping speed shall be either that speed at which wide open throttle torque drops off to zero, or the maximum speed as calculated for ungoverned engines, whichever is smaller.

(d) Determine maximum torque curve (i.e., map the engine).

(1) During engine warm-up, the engine may be operated such that a preliminary estimate of measured rated speed can be made.

(2) *Gasoline-fueled engines.* (i) Start the engine and operate at zero load in accordance with the manufacturer's start-up and warm-up procedures for 1 minute ±30 seconds.

(ii) Operate the engine at a torque equivalent to 10±3 percent of the most recent determination of maximum torque for 4 minutes ±30 seconds at 2,000 rpm.

(iii) Operate the engine at a torque equivalent to 55±5 percent of the most recent determination of maximum torque for 35 minutes ±1 minute at 2,000 rpm.

(iv) Operate the engine at idle.

(v) Operate the throttle fully.

(vi) While still maintaining wide-open throttle and full-load obtain minimum engine speed. Maintain minimum engine speed for 15 seconds. Record the average torque during the last 5 seconds.

(vii) In no greater than 100 RPM increments, determine the maximum torque curve from minimum speed to maximum speed. Hold each test point for 15 seconds and record the average torque over the last 5 seconds.

(viii) *Alternate mapping technique.* In place of paragraph (d)(2)(vi) and (vii) of this section, a continual sweep of RPM is allowed. While operating at

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wide open throttle, the engine speed is increased at a constant 8 RPM/second (± 1 RPM/second) from minimum speed to maximum speed. Speed and torque points shall be recorded at a sample rate of at least one point per second.

(ix) Recalculate minimum and maximum speeds per paragraph (b)(1) and (c)(1)(i) or (ii) of this section using the measured rated speed derived from the new maximum torque curve. If either of the new minimum or maximum speeds lay outside the range of speeds encompassed by the actual map, then the map shall be considered void. The entire mapping procedure shall be repeated, using the newly derived measured rated speed in all calculations.

(3) *Diesel engines.* (i) Start the engine and operate at free idle for 2 to 3 minutes.

(ii) Operate the engine at approximately 50 percent power at the peak torque speed for 5 to 7 minutes.

(iii) Operate the engine at rated speed and wide open throttle for 25 to 30 minutes.

(iv) *Option.* It is permitted to precondition the engine at rated speed and maximum horsepower until the oil and water temperatures are stabilized. The temperatures are defined as stabilized if they are maintained within 2 percent of point for 2 minutes. The engine must be operated a minimum of 10 minutes for this option. This optional procedure may be substituted for paragraph (d)(3)(iii).

(v) Unload the engine and operate at the low idle speed.

(vi) Operate the engine at wide open throttle and minimum engine speed. Increase the engine speed at a constant rate of 8 RPM/second (± 1 RPM/second) from minimum to maximum speed. Engine speed and torque points shall be recorded at a sample rate of at least one point per second.

(vii) Recalculate minimum and maximum speeds per paragraphs (b)(2) and (c)(2)(i) or (ii) of this section using the measured rated speed derived from the new maximum torque curve. If either of the new minimum or maximum speeds lay outside the range of speeds eccompassed by the actual map, then the map shall be considered void. The entire mapping procedure shall be repeated, using the newly derived measured rated speed in all calculations.

(e) Mapping curve generation.

(1) *Gasoline-fueled engines.* (i) Fit all data points recorded under paragraph (d)(2)(vi) and (vii) of this section (100 RPM increments) with a cubic spline technique.

(ii) All points generated under the continuous RPM sweep by paragraph (d)(2)(vi) and (viii) shall be connected by linear interpolation between points.

(iii) For governed engines, all points above the maximum speed (see paragraph (c)(1)(ii) of this section) shall be assigned maximum torgue values of zero for purposes of cycle generation.

(iv) For all engines, all speed points below 400 RPM shall be assigned a maximum torque value equal to that observed at 400 RPM for purposes of cycle generation.

(v) The torque curve resulting from paragraph (c)(1)(i) through (iv) of this section is the mapping curve and will be used to convert the normalized torque values in the engine cycle (see Appendix I, f) to actual torque values for the test cycle.

(2) *Diesel-engines.* (i) Connect all data points recorded under paragraph (d)(3)(vi) and (vii) of this section using linear interpolation between points.

(ii) For governed engines, all points above the maximum speed (see paragraph (c)(2)(ii) of this section) shall be assigned maximum torque values of zero for purposes of cycle generation.

(iii) For all engines, all speed points below 400 RPM shall be assigned a maximum torque value equal to that observed at 400 RPM for purposes of cycle generation.

(iv) The torque curve resulting from paragraph (c)(2) (i) through (iii) of this section is the mapping curve and will be used to convert the normalized torque values in the engine cycle (see Appendix I, g) into actual torque values for the test cycle.

(f) Alternate mapping and mapping curve generation techniques.

(1) If a manufacturer believes that the above mapping techniques are unsafe or unrepresentative for any given engine or engine family, alter-

nate mapping techniques may be used. Alternate techniques may be used only if approved in advance by the Administrator, and only if the Administrator judges the change to be justified, and the alternate procedure to be technically correct.

§ 86.1333-84 Transient test cycle generation.

(a) The heavy-duty transient engine cycles for gasoline- and diesel-fueled engines are listed in Appendix I (f and g). These second-by-second listings are designed to represent transient torque and RPM maneuvers characteristic of heavy-duty vehicles. Both RPM and torque are normalized in these listings.

(i) To unnormalize RPM use the following equation:

$$\text{Actual RPM} = \frac{\%\text{RPM (Measured rated RPM–Curb idle RPM)}}{100} + \text{Curb idle RPM}$$

(Curb idle for diesel engines is defined as the low idle RPM.)

(ii) Torque is normalized to the maximum torque at the RPM listed with it. Therefore, to unnormalize the torque values in the cycle, the maximum torque curve for the engine in question must be used. The generation of the maximum torque curve is described in § 86.1332-84.

(b) *Example of the unnormalization procedure. The following test point shall be unnormalized:*

$$\frac{\%\text{RPM}}{43} \qquad \frac{\%\text{ Torque}}{82}$$

The test engines have these values:

Measured Rated RPM = 3800 (Does not appear on given torque curve.)

Curb Idle RPM = 600.

Maximum torque curve as illustrated in Figure N84-11.

Calculate actual RPM:

$$\text{Actual RPM} = \frac{\%\text{RPM (measured rated RPM-idle RPM)}}{100} + \text{idle RPM}$$

$$\text{Actual RPM} = \frac{43\ (3800\text{-}600)}{100} + 600$$

$$\text{Actual RPM} = 1976$$

Determine actual torque:

Determine the maximum torque at 1976 RPM from Figure N84-11. Then multiply this value (358 ft-lb) by 0.82. This results in an actual torque of 294 ft-lbs.

(c) Engine speed and torque shall be recorded at least once every second during the cold start test and hot start test. The torque and RPM feedback signals may be electrically filtered.

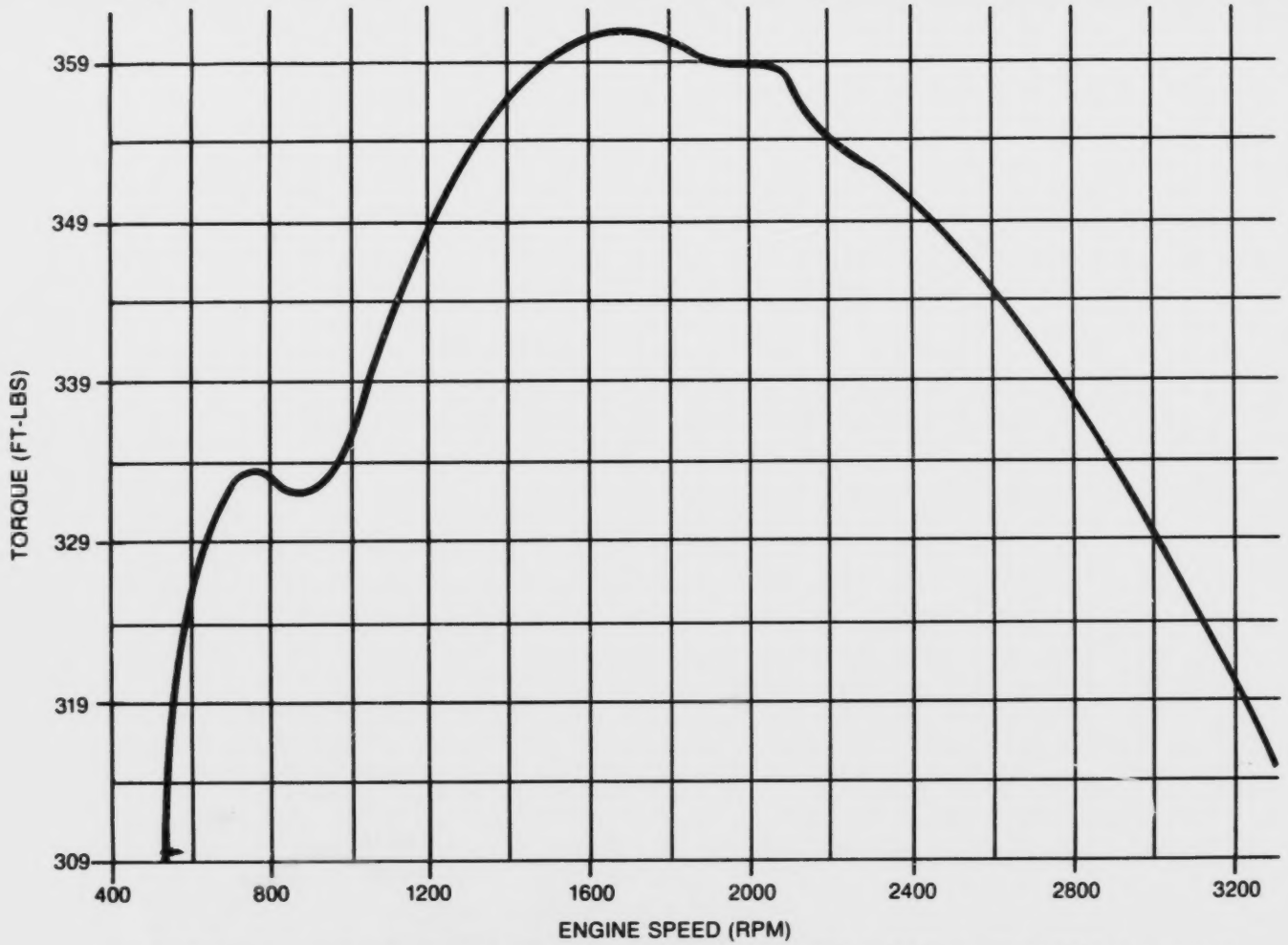

FIGURE N84-11 – SAMPLE MAXIMUM TORQUE CURVE FOR A GASOLINE-FUELED ENGINE.

(d) *Gasoline-fueled engines.* The zero percent speed specified in the gasoline-fueled engine cycle (Appendix I (f)) shall be superseded by proper operation of the engine's automatic choke.

(1) During automatic choke operation a manual transmission engine shall be allowed to idle at whatever speed is required to produce a feedback torque of 0 ft-lbs ± 10 ft-lbs (using for example clutch disengagement, speed to torque control switching, software overrides, etc.) at those points in Appendix I where both reference speed and reference torque are zero percent values.

(2) During automatic choke operation an automatic transmission engine shall be allowed to idle at whatever speed is required to produce a feedback torque of CITT ft-lbs ± 10 ft-lbs (see (e)(2) of this section for definition of CITT) at those points in Appendix I where both reference speed and reference torque are zero percent values.

(3) This automatic choke high idle allowance is permitted only for the first 150 seconds of the cold cycle and the first 30 seconds of the hot cycle, after which the cycles shall be run as specified in Appendix I (f). (See 86.1341-84 for allowances in the cycle validation criteria.)

(e) *Automatic Transmissions.* The reference cycles Appendix I (f and g) shall be altered for engines intended for use with automatic transmissions.

(1) Zero percent speed for automatic transmission engines is defined as curb idle RPM, i.e., in-vehicle, coupled with automatic transmission in gear.

(2) All zero-percent speed, zero-percent torque points (idle points) shall be modified to zero percent speed, x percent torque. Using the manufacturers' specified curb idle transmission torque (CITT), the maximum torque available at the curb idle (i.e., with transmission) RPM as determined from the maximum torque curve generated in § 86.1332-84 x percent torque is defined per the following equation:

$$x\% = \frac{\text{CITT} \cdot 100}{\text{Maximum torque at curb idle RPM}}$$

§ 86.1334-84 Pre-test engine and dynamometer preparation.

(a) *Control system calibration.* (1) Before the cold soak or cool down, final calibration of the dynamometer and throttle control systems may be performed. These calibrations may consist of steady-state operation and/or actual practice cycle runs, but emissions may not be measured.

(2) Following any practice runs or calibration procedures, the engine shall be turned off and allowed to either cold soak at 60° to 86° F for a minimum of 12 hours, or be cooled per § 86.1335-84.

§ 86.1335-84 Optional forced cool-down procedure.

(a) This forced cool-down procedure applies to both gasoline and diesel-fueled engines.

(b) No substances or fluids may be applied to the engines internal or external surfaces except for water and air, and only as prescribed in paragraph (c) and (d) of this section.

(c) For water-cooled engines two types of cooling are permitted.

(1) Water may be circulated through the engine's water coolant system.

(i) The cooling water may be flowed in either direction and at any desired flow rate. The thermostat may be removed or blocked open during the cool down but must be restored before the exhaust emissions test begins.

(ii) The temperature of the circulated or injected water shall be between 10° C (50° F) and 30° C (86° F).

(iii) No fluid except water and no fluid or substance in solution with water is permitted. This does not preclude the use of a building's standard water supply for forced cool-down purposes.

(2) Flows of air may be directed at the exterior of the engine.

(i) Air shall be directed uniformly over the entire exterior surface of the engine at any desired flow rate.

(ii) The temperature of the cooling air shall not exceed 30° C (86° F). This is the only occasion when test cell ambient air temperature may deviate from the general specifications set forth in § 86.1330-84(b), i.e., may be less than 20° C (68° F).

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(d) For air-cooled engines only cooling as prescribed in paragraph (c)(2) of this section is permitted.

(e) The cold cycle exhaust emission test may begin after a forced cool down only when the engine oil temperature as measured at the dipstick is between 20° C and 24° C (68° F and 75° F). No engine oil change is permitted during the test sequence, nor is any direct or indirect cooling of engine oil permitted except by natural conduction and convection associated with the procedures in paragraph (c) and (d) of this section.

(f) The cold cycle exhaust emission test for gasoline engines equipped with catalytic converters may begin after a forced cool down only when the catalyst bed temperature at the catalyst outlet is 25° C ± 5° C (77° F ± 9° F), in addition to the temperature restriction in paragraph (e) of this section.

(1) Catalyst cool down may be accomplished in whatever manner and using whatever coolant deemed appropriate by proper engineering judgment. The catalyst, engine, and exhaust piping configurations shall not be separated, altered, or moved in any way during the cool down.

(g) At the completion of the forced cool down, all general requirements specified in § 86.1330-84 and the oil temperature specification set forth in paragraph (e) of this section must be met before the cold cycle exhaust emission test may begin.

§ 86.1336-84 Engine starting and restarting.

(a) *Gasoline-fueled engines.* This paragraph applies to gasoline-fueled engines only.

(1) The engine shall be started with a production engine starter motor according to the manufacturer's recommended starting procedures in the owner's manual. The 24±1 second free idle period shall begin when the engine starts.

(2) *Choke operation:* (i) Engines equipped with automatic chokes shall be operated according to the manufacturer's operating instructions in the owner's manual, including choke setting and "kick-down" from cold fast idle.

(ii) Engines equipped with manual chokes shall be operated according to the manufacturer's operating instructions in the owner's manual.

(3) The operator may use the choke, throttle, etc. where necessary to keep the engine running.

(4) If the manufacturer's operating instructions in the owner's manual do not specify a warm engine starting procedure, the engine (automatic- and manual-choke engines) shall be started by depressing the throttle half way and cranking the engine until it starts.

(b) *Diesel engines.* The engine shall be started with a production engine starting-motor according to the manufacturer's recommended starting procedures in the owner's manual. The 24±1 second free idle period shall begin when the engine starts.

(c)(1) If the engine does not start after 15 seconds of cranking, cranking shall cease and the reason for failure to start shall be determined. The gas flow measuring device (or revolution counter) on the constant volume sampler (and the hydrocarbon integrator when testing diesel vehicles, see § 86.1337, Engine dynamometer test run) shall be turned off during this diagnostic period. In addition, either the CVS should be turned off or the exhaust tube disconnected from the tailpipe during the diagnostic period. If failure to start is an operational error, the engine shall be rescheduled for testing from a cold start.

(2) If longer cranking times are recommended to the ultimate purchaser, such cranking times may be used provided the owner's manual and the service repair manual indicate the longer cranking times are normal, and if the use of the longer cranking times is approved in advance by the Administrator.

(3) If a failure to start occurs during the cold portion of the test and is caused by an engine malfunction, corrective action of less than 30 minutes duration may be taken (according to § 86.084-25), and the test continued. The sampling system shall be reactivated at the same time cranking begins. When the engine starts, the timing sequence shall begin. If failure to start is caused by engine malfunction and the engine cannot be started,

the test shall be voided and corrective action may be taken according to § 86.084-25. The reasons for the malfunction (if determined) and the corrective action taken shall be reported to the Administrator.

(4) If a failure to start occurs during the hot start portion of the test and is caused by engine malfunction, the engine must be started within one minute of key on. The sampling system shall be reactivated at the same time cranking begins. When the engine starts, the transient engine cycle timing sequence shall begin. If the engine cannot be started within one minute of key on, the test shall be voided, corrective action taken (according to § 86.084-25), and the engine rescheduled for testing. The reason for the malfunction (if determined) and the corrective action taken shall be reported to the Administrator.

(d) If the engine "false starts", the operator shall repeat the recommended starting procedure (such as resetting the choke, etc.).

(e) *Engine stalling.* (1) If the engine stalls during the initial idle period of either the cold or hot start test, the engine shall be restarted immediately using the appropriate cold or hot starting procedure and the test continued. If the engine cannot be started before the first non-idle record of the cycle, the test shall be voided.

(2) If the engine stalls anywhere in the cold cycle, except in the initial idle period, the test shall be voided.

(3) If the engine stalls on the hot cycle portion of the test at any time up to and including 580 seconds into the hot cycle, the engine may be shut off and resoaked for 20 minutes. The hot cycle may then be rerun. Any stalling of the engine or voiding of the hot cycle more than 580 seconds into the hot cycle shall result in a void test. Only one hot start resoak and restart is permitted.

§ 86.1337-84 Engine dynamometer test run.

(a) The following steps shall be taken for each test:

(1) Prepare the engine, dynamometer, and sampling system for the cold start test. Change filters, etc. and leak check as necessary.

(2) Connect evacuated sample collection bags to the dilute exhaust and dilution air sample collection systems.

(3) Start the CVS (if not already on), the sample pumps, the temperature recorder, the engine cooling fan(s) and any data collection system (i.e., chart recorders, computers, data loggers, etc). The heat exchanger of the constant volume sampler (if used) and the heated components of any continuous sampling system(s) (if applicable) shall be preheated to their respective operating termperatures before the test begins. See § 86.1304-84(e) for continuous sampling procedures.

(4) Adjust the sample flow rates to the desired flow rate and set the CVS gas flow measuring devices to zero.

NOTE: CFV-CVS sample flow rate is fixed by the venturi design.

(5) Attach the CVS flexible exhaust tube to engine tailpipe(s).

(6) Follow the manufacturer's choke and throttle instructions for cold starting. Simultaneously start the engine and begin exhaust and dilution air sampling. For diesel engines, turn on the hydrocarbon and continuous NO_x, CO, or CO_2 (if used) analyzer(s) system integrator(s) and indicate the start of the test on the data collection medium (i.e., mark the chart on a chart recorder, set a byte on a computer or data logger, etc.).

(7) As soon as it is determined that the engine is started, start a "free idle" timer.

(8) Allow the engine to idle freely with no-load for 24 ± 1 seconds. This idle period for automatic transmission engines may be interpreted as an idle speed in neutral or park. All other idle conditions shall be interpreted as an idle speed in gear. It is permissible to lug the engine down to curb idle speed during the last 8 seconds of the free idle period for the purpose of engaging dynamometer control loops.

(9) Begin the transient engine cycles such that the first non-idle record of the cycle occurs at 25 ± 1 seconds. The free idle time is included in the 25 ± 1 seconds.

(10) On the last record of the cycle cease sampling, immediately turn the engine off, and start a hot soak timer.

(11) Immediately after the engine is turned off, turn off the engine cooling fan(s) if used, and the CVS blower. As soon as possible transfer the "cold start cycle" exhaust and dilution air bag samples to the analytical system and process the samples according to § 83.1340-84 obtaining a stabilized reading of the exhaust sample on all analyzers within 20 minutes of the end of the sample collection phase of the test.

(12) Allow the engine to soak for 20±1 minutes.

(13) Prepare the engine and dynamometer for the hot start test.

(14) Connect evacuated sample collection bags to the dilute exhaust and dilution air sample collection systems.

(15) Start the CVS (if not already on), the sample pumps, the temperature recorder, the engine cooling fan(s) and any data collection system (i.e., chart recorders, computers, data loggers, etc.). The heat exchanger of the constant volume sampler (if used) and the heated components of any continuous sampling system(s) (if applicable) shall be preheated to their respective operating temperatures before the test begins. See § 86.1340-84(e) for continuous sampling procedures.

(16) Adjust the sample flow rates to the desired flow rate and set the CVS gas flow measuring devices to zero.

NOTE: CFV-CVS sample flow rate is fixed by the venturi design.

(17) Follow the manufacturer's choke and throttle instruction for hot starting. Simultaneously start the engine and begin exhaust and dilution air sampling.

(18) As soon as it is determined that the engine is started, start a "free idle" timer.

(19) Allow the engine to idle freely with no-load for 24±1 seconds. The provisions and interpretations of paragraph (a)(8) of this section apply.

(20) Begin the transient engine cycle such that the first non-idle record of the cycle occurs at 25±1 seconds. The free idle is included in the 25±1 seconds.

(21) On the last record of the cycle cease sampling.

(22) As soon as possible transfer the "hot start cycle" exhaust and dilution air bag samples to the analytical system and process the samples according to § 86.1340-84 obtaining a stabilized reading of the exhaust sample on all analyzers within 20 minutes of the end of the sample collection phase of the test.

(23) The CVS and the engine may be turned off, if desired.

(b) The procedure in paragraph (a) of this section is designed for one sample bag for the cold start portion and one for the hot start portion. It is permissible to use 4 sample bags per test portion. The bags shall sample for the portion of the cycle as indicated below:

	Sample time	
	Gasoline fueled	Diesel
Bag No.:		
1	272	297
2	579	597
3	895	902
4	1,167	1,199

§ 86.1338-84 Emission measurement accuracy.

(a) Measurement accuracy for analysis systems used for bag measurements.

(1) Good engineering practice would dictate that analyzer readings below 15 percent of full scale chart deflection should generally not be used.

(2) Some high resolution read-out systems such as computers, data loggers, etc., can provide sufficient accuracy and resolution below 15 percent of full scale. Such systems may be used provided that additional calibration bottles are added to insure that the calibration curves below 15 percent of full scale, in the region of the sample measurements, conforms to the accuracy specifications in § 86.1316-84 through § 86.1326-84.

(b) Measurement accuracy for analysis systems used for continuous measurement systems.

(1) Analyzers used for continuous analysis must be operated such that the integrated concentration value over the test cycle falls between 15 and 100 percent of full scale chart de-

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flection. Exceptions to these limits are:

(i) If automatic range change circuitry is used and the limits for range changes are between 15 and 100 percent of full-scale chart deflection; or

(ii) Alternative paragraph (a)(2) of this section is used to insure that the accuracy of the calibration curve is maintained below 15 percent. In addition,

(iii) The analyzer's response may be less than 15 percent of full scale if the full-scale value is 155 ppmC or less.

(iv) The analyzer's response may be less than 15 percent of full scale if the emissions from the engine are erratic and the integrated chart deflection value is greater than 15 percent of full scale.

(v) The analyzer's response may be less than 15 percent of full scale if the contribution of all data read below the 15 percent level is less than 10 percent by mass of the final test results, and

(vi) During engine start-up the HC analyzer is allowed to "spike" off-scale for a maximum of 5 seconds.

§ 86.1339–84 [Reserved]

§ 86.1340 Exhaust sample analysis.

(a) The analyzer response may be read by automatic data collection (ADC) equipment such as computers, data loggers, etc. If ADC equipment is used the following is required.

(1) For bag analysis the analyzer response must be stable at greater than 99 percent of final reading. A single value representing the average chart deflection over a 10 second stabilized period may be stored.

(2) For continuous analysis systems, the ADC system must store at least 5 chart deflection readings per second.

(3) The chart deflections in paragraphs (a) (1) and (2) of this section may be stored on long term computer storage devices such as computer tapes, storage discs, punch cards, or they may be printed in a listing for storage. In either case a chart recorder is not required and records from a chart recorder, if they exist, need not be stored.

(4) If the data from ADC equipment is used as permanent records, the ADC equipment and the analyzer values as interpreted by the ADC equipment are subject to the calibration specifications in §§ 86.1316–84 through 86.1326–84, as if the ADC equipment were part of the analyzer.

(b) Data records from any one or a combination of analyzers may be stored as chart recorder records.

(c) Software zero and span.

(1) The use of "software" zero and span is permitted. The process of software zero and span refers to the technique of initially adjusting the analyzer zero and span responses to the calibration curve values, but for subsequent zero and span checks the analyzer response is simply recorded without adjusting the analyzer gain. The observed analyzer response recorded from the subsequent check is mathematically corrected back to the calibration curve values for zero and span. The same mathematical correction is then applied to the analyzer's response to a sample of exhaust gas in order to compute the true sample concentration.

(2) The maximum amount of software zero and span mathematical correction is ±10 percent of full scale chart deflection.

(3) Software zero and span may be used to switch between ranges without adjusting the gain of the analyzer.

(4) The software zero and span technique may not be used to mask analyzer drift. The observed chart deflection before and after a given time period or event shall be used for computing the drift. Software zero and span may be used after the drift has been computed to mathematically adjust any span drift so that the "after" span check may be transformed into the "before" span check for the next segment.

(d) For bag sample analysis perform the following sequence:

(1) Warm up and stablize the analyzers.

(2) Clean and/or replace filter elements, conditioning columns (if used), etc., as necessary.

(3) The order of paragraphs (d) (1) and (2) of this section may be interchanged.

(4) Obtain a stable zero reading.

(5) Zero and span the analyzers with zero and span gases. The span gases shall have concentrations between 75

and 100 percent of full scale chart deflection. The flow rates and system pressures during spanning shall be approximately the same as those encountered during sampling.

(6) Re-check zero response, repeat paragraphs (d) (4) and (5) of this section or use software zero and span if necessary.

(7) If a chart recorder is used, identify the most recent zero and span response as the pre-analysis values.

(8) If ADC equipment is used, electronically record the most recent zero and span response as the pre-analysis values.

(9) Measure HC (except diesels), CO, CO_2 and NO_x concentrations in the sample bag(s) with approximately the same flow rates and pressures used in paragraph (d)(5) of this section. Constituents measured continuously do not require bag analysis.

(10) Rechecking of the zero and span point after the analysis of the bag is permitted. The number of bags that may be analyzed after pre-analysis values for zero and span have been determined is not specified. The limiting criteria on the time span or the number of events that may occur between the pre-analysis and post-analysis zero span checks are the following:

(i) A pre-analysis zero and span value for each range of each constituent to be analyzed must be determined and identified or recorded prior to analyzing the bag. The bag may be sampled in order to identify the specific range required prior to the determination of the pre-analysis values.

(ii) A post-analysis zero and span check for each range used must be performed and the values recorded. The time interval or the number of events that may occur between the pre and post checks is not specified. However, the difference between pre-analysis zero and span values (recorded in paragraph (d) (7) and (8) of this section) versus those recorded for the post-analysis check may not exceed the zero drift limit or the span drift limit of 2 percent of full scale chart deflection for any range used.

(iii) The time span between the pre and post checks may be no longer than the time period that was used to evaluate the analyzer drift performance.

(11) Analyze the remaining sample and background bags as outlined in paragraph (d) (4) through (10) of this section.

(e) For continuous sample analysis perform the following sequences:

(1) Warm-up and stabilize the analyzers.

(2) Clean and/or replace filters elements, conditioning columns (if used) etc., as necessary.

(3) The order of paragraphs (d) (1) and (2) of this section may be interchanged.

(4) Leak check portions of the sampling system that operate under a vacuum when sampling.

(5) Allow heated sample lines, filters, pumps, etc., to stabilize at operating temperature.

(6) The order of paragraphs (d) (4) and (5) may be interchanged.

(7) Obtain a stable zero reading.

(8) Zero and span each range to be used on each analyzer used prior to the beginning of the cold cycle. The span gases shall have a concentration between 75 and 100 percent of full scale chart deflection. The flow rates and system pressures shall be approximately the same as those encountered during sampling.

(9) Re-check zero response, repeat paragraphs (d) (7) and (8) of this section or use software zero and span if necessary.

(10) If a chart recorder is used, identify the most recent zero and span response as the pre-analysis values.

(11) If ADC equipment is used, electronically record the most recent zero and span response as the pre-analysis values.

(12) Measure the emissions (HC required for diesels, NO_x, CO, CO_2 optional) continuously during the cold start cycle. Indicate the start of the test, the range(s) used, and the end of the test on the recording medium (chart paper or ADC equipment). Use approximately the same flow rates and system pressures used in paragraph (d)(8) of this section.

(13) Collect background HC, CO, CO_2, and NO_x in a sample bag.

(14) Perform a post-analysis zero and span check for each range used at

the conditions specified in paragraph (d)(8) of this section.

(15) Neither the zero drift nor the span drift between the pre-analysis and post-analysis checks on any range used may exceed 3 percent for HC or 2 percent for NO_x, CO, and CO_2 of full scale chart deflection, or the test is void.

(16) Determine HC background levels for the cold start cycle by introducing a sample from the background bag into the overflow HC span system.

(17) Determine background levels of NO_x, CO, or CO_2 (if necessary) by the technique outlined in paragraph (e) of this section. the continuous analyzers may be used for analysis under paragraph (e).

NOTE: For a quality control check on diesel HC, compare an analysis of a background bag to a continuous analysis of background air sampled through the total hydrocarbon probe. For best results, the difference should be less than 1 percent of the average (time integrated) dilute hydrocarbon emission level during the test.

(18) Repeat paragraphs (d) (7) through (17) of this section for the hot cycle. The post-analysis zero and span check for the cold start (or previous hot start) cycle may be used for the pre-analysis zero and span for the following hot start cycle.

(19) If the HC drift is greater than 3 percent of full-scale chart deflection, hydrocarbon hang-up is suspected.

(f) HC hang-up. If HC hang-up is suspected, the following sequence may be performed.

(1) Fill a clean sample bag with zero gas.

(2) Zero and span the HFID with the overflow system.

(3) Analyze the sample bag through the overflow sample system.

(4) Analyze the sample bag on another FID or HFID meeting the specification of this subpart or 40 CFR, Subpart D that does not have a hang-up problem.

(5) If the difference between the readings obtained in (3) percent of the HFID full scale disconnect probe and clean same. (Soaking with sulfuric acid has proven effective.) Clean sample line also. (Heating to 450° F and flow nitrogen gas continuously for 12 hours has proven useful.)

(6) Reassemble the sample system, heat to specified temperature, and repeat the procedure in paragraph (f) (1) through (6) of this section.

§ 86.1341-84 Test cycle validation criteria.

(a) To reduce errors between the feedback and reference (cycle trace) values the engine speed and torque feedback signals may be shifted a maximum of ±5 seconds with respect to the reference speed and torque traces. If the feedback signals are shifted, both speed and torque must be shifted the same amount in the same direction.

(b) Calculate the brake horsepower for each pair of engine speed and torque values recorded. Also calculate the reference brake horsepower for each pair of engine speed and torque reference values. Calculations shall be to five significant digits.

(c) Linear regressions of feedback value on reference value shall be performed for speed, torque and brake horsepower. The method of least-square shall be used. The equation shall have the form:

$y = mx + b$

Where:

y = The feedback (actual) value of speed (in RPM), torque (in ft-lbs.), or brake horsepower.
m = Slope of the regression line.
x = The reference value (speed, torque, or brake horsepower).
b = The y intercept of the regression line.

(d) The standard error of estimate (SE) of y on x and the coefficient of determination (r^2) shall be calculated for each regression line.

(e) For a valid test the criteria in Figure N84-12 must be met for both cycles (cold start and hot start) individually. Deletions from the regression analysis are permitted where allowed in Figure N84-12.

(f) The integrated brake horsepower-hour for each cycle (cold and hot start) shall be between −15 percent and +5 percent of the integrated brake horsepower-hour for the reference cycle or the test is void. All torque and speed data points must be used to calculate the integrated brake horsepower-hour. For the purposes of this calculation, negative torque

values (i.e., motoring horsepower) shall be set equal to zero and included.

(g) If a dynamometer test run is determined to be statistically or experimentally void, corrective action shall be taken. The engine shall then be allowed to cool (naturally or forced) and the dynamometer test rerun per § 86.1337-84.

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REGRESSION LINE TOLERANCES

	SPEED	TORQUE	BRAKE HORSEPOWER
STANDARD ERROR OF ESTIMATE (SE) OF Y ON X	100 RPM	13% OF MAXIMUM ENGINE TORQUE	8% OF MAXIMUM BRAKE HORSEPOWER
SLOPE OF THE REGRESSION LINE, M	0.970-1.030	0.83-1.03 HOT 0.77-1.03 COLD	0.89-1.03 (HOT) 0.87-1.03 (COLD)
COEFFICIENT OF DETERMINATION, R^2	0.9700 1/	0.8800 (HOT) 1/ 0.8500 (COLD) 1/	0.9100 1/
Y INTERCEPT OF THE REGRESSION LINE, B	± 50 RPM	± 15 FT. LBS.	± 5.0 OF BRAKE HORSEPOWER

1/ MINIMUM

PERMITTED POINT DELETIONS FROM REGRESSION ANALYSIS

CONDITION	POINTS TO BE DELETED
FIRST 24 SECONDS (± 1) OF FREE IDLE OF HOT AND COLD CYCLES	SPEED, TORQUE, BRAKE HORSEPOWER
WIDE OPEN THROTTLE { SPEED CONTROL: TORQUE FEEDBACK < TORQUE REFERENCE }	TORQUE, BRAKE HORSEPOWER
WIDE OPEN THROTTLE { TORQUE CONTROL: SPEED FEEDBACK < SPEED REFERENCE }	SPEED, BRAKE HORSEPOWER
SPEED CONTROL, CLOSED THROTTLE, TORQUE REFERENCE < ZERO	TORQUE, BRAKE HORSEPOWER
GASOLINE FUELED ENGINES EQUIPPED WITH AUTOMATIC CHOKES; FIRST 150 SECONDS OF COLD CYCLE OR FIRST 30 SECONDS OF HOT CYCLE, CLOSED THROTTLE AND: MANUAL TRANSMISSION, IF TORQUE FEEDBACK	
A. IS EQUAL TO ZERO (± 10 FT. LBS.) OR;	SPEED BRAKE HORSEPOWER
B. AUTOMATIC TRANSMISSION, IF TORQUE FEEDBACK IS EQUAL TO CURB IDLE TRANSMISSION TORQUE (± 10 FT. LBS.)	SPEED BRAKE HORSEPOWER

FIGURE N84-12

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§ 86.1342-84 Calculations; exhaust emissions.

(a) The final reported transient emission test results shall be computed by use of the following formula:

$$A_{wm} = \frac{1/7(g_C) + 6/7(g_H)}{1/7(BHP\text{-}Hr_C) + 6/7(BHP\text{-}Hr_H)}$$

Where:

A_{wm} = Weighted mass emission level (HC, CO, CO_2 or NO_x) in grams per brake horsepower hour.

g_C = Mass emission level in grams, measured during the cold start test.

g_H = Mass emissions level in grams, measured during the hot start test.

$BHP\text{-}HR_C$ = Total brake horsepower-hour (brake horsepower integrated with respect to time) for the cold start test.

$BHP\text{-}HR_H$ = Total brake horsepower-hour (brake horsepower integrated with respect to time) for the hot start test.

(b) The mass of each pollutant for the cold start test and the hot start test for bag measurements and diesel heat exchanger sample system measurements is determined from the following equations:

(1) Hydrocarbon mass: $HC_{mass} = V_{mix} \times Density_{HC} \times (HC_{conc}/1{,}000{,}000)$.

(2) Oxides of nitrogen mass: $NO_{x\ mass} = V_{mix} \times Density_{NO2} \times K_H \times (NO_{x\ conc}/1{,}000{,}000)$.

(3) Carbon monoxide mass: $CO_{mass} = V_{mix} \times Density_{CO} \times (CO_{conc}/1{,}000{,}000)$.

(4) Carbon dioxide mass: $CO_{2\ mass} = V_{mix} \times Density_{CO2} \times (CO_{2\ conc}/100)$.

(c) The mass of each pollutant for the cold start test and the hot start test for flow compensated sample systems is determined from the following equations:

$$(1)\ HC_{mass} = \sum_{i=1}^{n} \left[\frac{(HC_e)_i}{10^6} \times (Vmix)_i \times (Density_{HC}) \times \Delta T \right] - \frac{HC_d}{10^6}\left(1 - \frac{1}{DF}\right) \times Vmix \times Density_{HC}$$

$$(2)\ NOx_{mass} = \sum_{i=1}^{n} \left[\frac{(NOx_e)_i}{10^6} \times (Vmix)_i \times (Density_{NO_2}) \times \Delta T \right] - \frac{NOx_d}{10^6}\left(1 - \frac{1}{DF}\right) \times Vmix \times Density\ NO_2$$

$$(3)\ CO_{mass} = \sum_{i=1}^{n} \left[\frac{(CO_e)_i}{10^6} \times (Vmix)_i \times (Density_{CO}) \times \Delta T \right] - \frac{CO_d}{10^6}\left(1 - \frac{1}{DF}\right) \times Vmix \times Density_{CO}$$

$$(4)\ CO_{2mass} = \sum_{i=1}^{n} \left[\frac{(CO_{2_e})_i}{10^6} \times (Vmix)_i \right] \times (Density_{CO_2}) \times \Delta T - \frac{CO_{2_d}}{10^6}\left(1 - \frac{1}{DF}\right) \times Vmix \times Density_{CO_2}$$

(d) Meaning of symbols:

(1) HC_{mass} = Hydrocarbon emissions, in grams per test phase.

Density = Density of hydrocarbons is 16.33 g/ft^3 (.5768 kg/m^3), assuming an average carbon to hydrogen ratio of 1:1.85, at 68° F (20° C) and 760 mm Hg (101.3 kPa) pressure.

HC_{conc} = Hydrocarbon concentration of the dilute exhaust sample corrected for background, in ppm carbon equivalent, i.e., equivalent propane X3.

$HC_{conc} = HC_e - HC_d[1 - (1/DF)]$

Where:

HC_e = Hydrocarbon concentration of the dilute exhaust bag sample or, for diesel heat exchanger systems, average hydrocarbon concentration of the dilute exhaust sample as calculated from the integrated HC traces, in ppm carbon equivalent. For flow compensated sample systems HC_e is the instantaneous concentration.

HC_d = Hydrocarbon concentration of the dilution air as measured, in ppm carbon equivalent.

(2) $NO_{x\ mass}$ = Oxides of nitrogen emissions, in grams per test phase.

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$Density_{NO2}$ = Density of oxides of nitrogen is 54.16 g/ft³ (1.913 kg/m³), assuming they are in the form of nitrogen dioxide, at 68° F (20° C) and 760 mm Hg (101.3 kPa) pressure.

$NO_{x\ conc}$ = Oxides of nitrogen concentration of the dilute exhaust sample corrected for background, in ppm.

$NO_{x\ conc} = NO_{x\ e} - NO_{x\ d}[1-(1/DF)]$.

Where:

$NO_{x\ e}$ = Oxides of nitrogen concentration of the dilute exhaust bag sample as measured, in ppm. For flow compensated sample systems $NO_{x\ e}$ is the instantaneous concentration.

$NO_{x\ d}$ = Oxides of nitrogen concentration of the dilute air as measured, in ppm.

(3) CO_{mass} = Carbon monoxide emissions, in grams per test phase.

$Density_{CO}$ = Density of carbon monoxide is 32.97 g/ft³ (1.164 kg/m³), at 68° F (20° C) and 760 mm Hg (101.3 kPa) pressure.

CO_{conc} = Carbon monoxide concentration of the dilute exhaust sample corrected for background, water vapor, and CO_2 extraction, in ppm.

$CO_{conc} = CO_e - CO_d\ [1-(1/DF)]$.

Where:

CO_e = Carbon monoxide concentration of the dilute exhaust bag sample volume corrected for water vapor and carbon dioxide extraction, in ppm. For flow compensated sample systems CO_e is the instantaneous concentration. The calculation assumes the carbon to hydrogen ratio of the fuel is 1:1.85.

$CO_e = [1-0.01925CO_{2e}-0.000323R]CO_{em}$.

Where:

CO_{em} = Carbon monoxide concentration of the dilute exhaust sample as measured, in ppm.

CO_{2e} = Carbon dioxide concentration of the dilute exhaust bag sample, in percent. For flow compensated sample systems CO_{2e} is the instantaneous concentration.

R = Relative humidity of the dilution air, in percent (see § 86.1342-84(a)(5)).

CO_d = Carbon monoxide concentration of the dilution air corrected for water vapor extraction, in ppm.

$CO_d = (1-0.000323R)CO_{dm}$.

Where:

CO_{dm} = Carbon monoxide concentration of the dilution air sample as measured, in ppm.

Δt = Time interval (in seconds) between samples in flow compensated systems (0.2 seconds maximum).

NOTE: If a CO instrument which meets the criteria specified in § 86.1311-84 is used and the conditioning column has been deleted, CO_{em} can be substituted directly for CO_e and CO_{dm} can be substituted directly for CO_d.

(4) $CO_{2\ mass}$ = Carbon dioxide emissions, in grams per test phase.

$Density_{CO2}$ = Density of carbon dioxide is 51.85 g/ft³ (1.843 kg/m³), at 68°F (20°C) and 760 mm Hg (101.3 kPa) pressure.

$CO_{2\ conc}$ = Carbon dioxide concentration of the dilute exhaust sample corrected for background, in percent.

$CO_{2\ conc} = CO_{2e} - CO_{2d}[1-(1/DF)]$.

Where:

CO_{2d} = Carbon dioxide concentration of the dilution air as measured, in percent.

(5) $DF = 13.4/[CO_{2e} + (HC_e + CO_e \times 10^{-4}]$.

K_H = Humidity correction factor.

For gasoline engines;

$K_H = 1/[1-0.0047\ (H-75)]$.

(or for SI units $= 1/[1-0.0329(H-10.71)]$).

For diesel engines;

$K_H = 1$.

Where:

H = Absolute humidity in grains (grams) of water per pound (kilogram) of dry air.

$H = [(43.478)R_a \times P_d]/[P_B - (P_d \times R_a/100)]$ for SI units, $H = [(6.211)R_a \times P_d]/[P_B - (P_d \times R_a/100)]$.

R_a = Relative humidity of the ambient air, in percent.

P_d = Saturated vapor pressure, in mm Hg (kPa) at the ambient dry bulb temperature.

P_B = Barometric pressure, in mm Hg (kPa).

V_{mix} = Total dilute exhaust volume in cubic feet per test phase corrected to standard conditions (528° R (293° K) and 760 mm Hg (101.3 kPa).

V_{mix} = Instantaneous dilute exhaust volumetric flow rate (for compensated flow systems), in cubic feet per second.

For PDP–CVS, V_{mix} is:

Where:

$$V_{mix} \quad V_o = \frac{N(P_B - P_d)(528°R)}{(760\ mmH_g)(T_p)}$$

for SI units,

$$V_{mix} \quad V_o = \frac{N(P_B - P_d)(293.15°K)}{(101.3kPa)(T_p)}$$

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V_0 = Volume of gas pumped by the positive displacement pump, in cubic feet (cubic metres) per revolution. This volume is dependent on the pressure differential across the positive displacement pump.
N = Number of revolutions of the positive displacement pump during the test phase while samples are being collected.
P_B = Barometric pressure, in mm Hg (kPa).
P_1 = Pressure depressions below atmospheric measured at the inlet to the positive displacement pump, in mm Hg (kPa) (during an idle mode).
T_p = Average temperature of dilute exhaust entering positive displacement pump during test, °R (°K).

(e) Sample calculation of mass values of exhaust emissions:

(1) Assume the following test results for gasoline engine:

	Cold start cycle test results	Hot start cycle test results
V_{mix}	6924 ft³	6873 ft³.
R	30.2 pct	30.2 pct.
R_a	30.2 pct	30.2 pct.
P_B	735 mm Hg	735 mm Hg.
P_d	22.676 mm Hg	22.676 mm Hg.
HC_e	132.07 ppm C equivalent.	86.13 ppm C equivalent.
NO_{x_e}	7.86 ppm	10.98 ppm.
CO_{em}	171.22 ppm	114.28 ppm.
CO_{2e}	.178 pct	.381 pct.
HC_d	3.60 ppm C equivalent.	8.70 ppm C equivalent.
NO_{x_d}	0.0 ppm	010 ppm.
CO_{dm}	0.89 ppm	0.89 ppm.
CO_{2d}	0.0 pct	0.038 pct.
BHP-HR	0.259	0.347.

Then:

Cold Start Test

$H = [(43.478)(30.2)(22.676)]/[735-(22.676)(30.2)/100] = 41$ grains of water per pound of dry air.
$K_H = 1/[1-0.0047(41-75)] = 0.862$
$CO_c = [1-0.01925(.178) - 0.000323(30.2)]171.22 = 169.0$ ppm
$CO_d = [1-0.000323(30.2)]0.89 = .881$ ppm
$DF = 13.4/[.178+(132.1+168.9)(10^{-4})] = 64.392$
$HC_{conc} = 132.1-3.6[1-(1/64.265)] = 128.6$ ppm
$HC_{mass} = 6924(16.33)(128.6/1,000,000) = 14.53$ grams
$NO_{x\ conc} = 7.86-0.0[1-(1/64.265)] = 7.86$ ppm
$NO_{x\ mass} = 6924(54.16)(.862)(7.86/1,000,000) = 2.54$ grams
$CO_{conc} = 169.0-.881[1-(1/64.265)] = 168.0$ ppm
$CO_{mass} = 6924(32.97)(168.0/1,000,000) = 38.35$ grams
$CO_{2\ conc} = .178\ \ 0[1\ \ 1/64.265)] = .178\%$
$CO_{2\ mass} = 6924(51.85)(.178/100) = 639$ grams

Hot Start Test

Assume similar calculations result in the following:

$HC_{mass} = 8.72$ grams
$NO_{x\ mass} = 3.49$ grams
$CO_{mass} = 25.70$ grams
$CO_{2\ mass} = 1226$ grams

(2) Weighted mass emission results:

$$HC_{wm} = \frac{1/7(14.53) + 6/7(8.72)}{1/7(0.259) + 6/7(0.347)}$$

$$= 28.6 \text{ grams/BHP-HR}$$

$$NOx_{wm} = \frac{1/7(2.54) + 6/7(3.49)}{1/7(0.259) + 6/7(0.347)}$$

$$= 10.0 \text{ grams/BHP-HR}$$

$$CO_{wm} = \frac{1/7(38.35) + 6/7(25.70)}{1/7(0.259) + 6/7(0.347)}$$

$$= 82.2 \text{ grams/BHP-HR}$$

$$CO_{2_{wm}} = \frac{1/7(639) + 6/7(1226)}{1/7(0.259) + 6/7(0.347)}$$

$$= 3415 \text{ grams/ BHP-HR}$$

(f) The final reported brake-specific fuel consumption (BSFC) shall be computed by use of the following formula:

$$BSFC = \frac{1/7(M_C) + 6/7(M_H)}{1/7(BHP\text{-}HR_C) + 6/7(BHP\text{-}HR_H)}$$

Where:

BSFC = brake-specific fuel consumption in pounds of fuel per brake horsepower-hour (lbs/BHP-HR).
M_c = mass of fuel, in pounds, used by the engine during the cold start test.

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M_H = mass of fuel, in pounds, used by the engine during the hot start test.
$BHP\text{-}HR_c$ = total brake horsepower-hours (brake horsepower integrated with respect to time) for the cold start test.
$BHP\text{-}HR_H$ = total brake horsepower-hours (brake horsepower integrated with respect to time) for the hot start test.

(g) The mass of fuel for the cold start and hot start test is determined from the following equation:

$$M = (G_s/R_2)\,(1/453.6)$$

(h) Meaning of symbols:

M = Mass of fuel, in pounds, used by the engine during the cold or hot start test.
G_s = Grams of carbon measured during the cold or hot start test.

$$G_s = [12.011/(12.011 + \alpha(1.008))]HC_{mass} + 0.429CO_{mass} + 0.273\ CO_{2\,mass}$$

Where:

HC_{mass} = Hydrocarbon emissions, in grams for cold or hot start test.
CO_{mass} = Carbon monoxide emissions, in grams for cold or hot start test.
$CO_{2\,mass}$ = Carbon dioxide emissions, in grams for cold or hot start test.
α = The measured hydrogen to carbon ratio of the fuel.
R_2 = The grams of carbon in the fuel per gram of fuel

$$R_2 = 12.011/[12.011 + \alpha(1.008)]$$

(i) Sample calculation of brake-specific fuel consumption:

(1) Assume the following test results:

	Cold start cycle test results	Hot start cycle test results
BHP-HR	6.945	7.078.
α	1.85	1.85.
HC_{mass}	37.08 grams	28.82 grams.
CO_{mass}	357.69 grams	350.33 grams.
$CO_{2\,mass}$	5419.62 grams	5361.32 grams.

Then:

G_s for cold start test = [12.011/(12.011 + (1.85)(1.008))](37.08) + 0.429(357.69) + 0.273(5419.62) = 1665.10 grams
G_s for hot start test = [12.011/(12.011 + (1.85)(1.008))](28.82) + 0.429(350.33) + 0.273(5361.32) = 1638.88 grams
$R_2 = 12.011/[12.011 + 1.85(1.008)] = .866$
$M_c = (1665.10/.866)(1/453.6) = 4.24$ lbs.
$M_H = (1638.88/.866)(1/453.6) = 4.17$ lbs.

(2) Brake-specific fuel consumption results:

$$BSFC = \frac{1/7(4.24) + 6/7(4.17)}{1/7(6.945) + 6/7(7.078)} = .592 \text{ lbs.of fuel/BHP-HR}$$

§ 86.1343-84 [Reserved]

§ 86.1344-84 Required information.

(a) The required test data shall be grouped into the following three general categories:

(1) *Engine set-up and descriptive data.* This data must be provided to the EPA supervisor of engine testing for each engine sent to the Administrator for confirmatory testing prior to the initiation of engine set-up. This data is necessary to insure that EPA test personnel have the correct data in order to set up and test the engine in a timely and proper manner. This data is not required for tests performed by the manufacturers.

(2) *Pre-test data.* This data is general test data that must be recorded for each test. The data is of a more descriptive nature such as identification of the test engine, test site number, etc. As such, this data can be recorded at any time within 24 hours of the test.

(3) *Test-data.* This data is physical test data that must be recorded at the time of testing.

(b) All data may be supplied to the Administrator by punch cards, magnetic tape, or other electronic data processing means. Acceptable data formats and transmission techniques will be provided in the Application Format for Certification of the applicable Model Year.

(c) *Engine set-up data.* Because the specific test facilities may change somewhat with time, the specific data parameters and number of items may vary slightly. The Application Format

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for Certification for the applicable Model Year will specify the exact requirements. In general, the following type of data will be required:

(1) Engine manufacturer.

(2) Engine system combination.

(3) Engine code and CID.

(4) Engine identification number.

(5) Applicable engine model year.

(6) Engine fuel type.

(7) Recommended oil type.

(8) Exhaust pipe configuration pipe sizes, etc.

(9) Curb idle speed.

(10) Dynamometer idle speed. (Automatic transmission engines only.)

(11) Engine parameter specifications such as spark timing, operating temperature, advance curves, etc.

(12) Engine performance data such as, maximum BHP, rated speed, fuel flow, governed speed, etc.

(13) Recommended start-up procedure.

(14) Maximum safe engine operating speed.

(15) Number of hours of operation accumulated on engine.

(d) *Pre-test data.* The following data shall be recorded, and reported to the Administrator for each test conducted for Compliance with the provisions of 40 CFR 86, Subpart A:

(1) Engine-system combination.

(2) Engine identification.

(3) Instrument operator(s).

(4) Engine operator(s).

(5) Number of hours of operation accumulated on the engine prior to beginning the test sequence (Figure N84-10).

(6) Fuel identification with average of test fuel used.

(7) Date of most recent analytical assembly calibration.

(8) All pertinent instrument information such as tuning, gain, serial numbers, detector number, calibration curve number, etc. As long as this information is traceable, it may be summarized by system number or analyzer identification numbers.

(e) *Test data.* The physical parameters necessary to compute the test results and insure accuracy of the results shall be recorded for each test conducted for compliance with the provisions of 40 CFR 86, Subpart A. Additional test data may be recorded at the discretion of the manufacturer. Extreme details of the test measurements such as analyzer chart deflections will generally not be required on a routine basis to be reported to the Administrator for each test, unless a dispute about the accuracy of the data arises. The following type of data shall be required to be reported to the Administrator. The Application Format for Certification for the applicable Model Year will specify the exact requirements which may change slightly from year to year with the addition or deletion of certain items.

(1) Date and time of day.

(2) Test number.

(3) Engine intake air or test cell temperature.

(4) Barometric pressure. A central laboratory barometer may be used:

Provided, that individual test cell barometric pressure are shown to be within ±0.1 percent of the barometric pressure at the central barometer location.

(5) Engine intake or test cell and CVS dilution air humidity.

(6) Maximum torque versus speed curve as determined in § 86.1332, with minimum and maximum engine speeds.

(7) Measured maximum horsepower, maximum torque, and rated speeds.

(8) Measured maximum horsepower and torque.

(9) High idle engine speed (diesel engines only).

(10) Fuel consumption at maximum power and torque (diesel engines only).

(11) Curb-idle fuel flow rate.

(12) Cold soak time interval and cool down procedures.

(13) Temperature set point of the heated continuous analysis system components (if applicable).

(14) Test cycle validation criteria as specified in § 86.1341 for each test phase (cold-hot).

(15) Total CVS flow rate with dilution factor for each test phase (cold-hot).

(16) Sample concentrations (background corrected) for HC, CO, CO_2, and NOx for each test phase (cold-hot).

(17) Brake specific emissions (g/BHP-hr) for HC, CO and NOx for each test phase (cold-hot).

(18) The weighted (cold-hot) brake specific emissions (g/BHP-hr) for the total test.

(19) The weighted (cold-hot) carbon balance brake specific fuel consumption for the total test.

(20) The number of hours of operation accumulated on the engine after completing the test sequences described in Figure N84-10.

[45 FR 4181, Jan. 21, 1980, as amended at 45 FR 63772, Sept. 25, 1980]

Subpart O—[Reserved]

Subpart P—Emission Regulations for New Gasoline-Fueled Heavy-Duty Engines and Vehicles; Idle Test Procedures

SOURCE: 45 FR 4224, Jan. 21, 1980, unless otherwise noted.

§ 86.1501-84 Scope; applicability.

This subpart contains gaseous emission idle test procedures for heavy-duty gasoline-fueled engines and vehicles. It applies to 1984 and later model years.

§ 86.1502-84 Definitions.

The definitions in § 86.084-2 apply to this subpart.

§ 86.1503-84 Abbreviations.

The abbreviations in § 86.084-3 apply to this subpart.

§ 86.1504-84 Section numbering; construction.

(a) The model year of initial applicability is indicated by the section number. The two digits following the hyphen designate the first model year for which a section is effective. A section remains effective until superseded.

Example: Section 86.1511-84 applies to the 1984 and subsequent model years until superseded. If a section 86.1511-85 is promulgated, it would take effect beginning with the 1985 model year; § 86.1511-83 would apply to model years 1983 and 1984.

(b) A section reference without a model year suffix refers to the section applicable for the appropriate model year.

(c) Unless indicated, all provisions in this subpart apply to gasoline-fueled heavy-duty engines and vehicles.

§ 86.1505-84 Introduction; structure of subpart.

(a) This subpart describes the equipment required and the procedures to follow in order to perform idle exhaust emission tests on gasoline-fueled heavy-duty engines and vehicles. Subpart A sets forth the testing requirements and test intervals necessary to comply with EPA certification procedures.

(b) Four topics are addressed in this subpart. Sections 86.1505-84 through 86.1515-84 set forth specifications and equipment requirements; §§ 86.1516-84 through 86.1526-84 discuss calibration methods and frequency; test procedures and data requirements are listed (in approximately chronological order) in §§ 86.1527-84 through 86.1542-84; and calculation formulas are found in § 86.1544-84.

§ 86.1506-84 Equipment required and specifications; overview.

(a) This subpart contains procedures for idle exhaust emission tests on gasoline-fueled heavy-duty vehicles and engines. Equipment required and specifications are as follows:

(1) *Exhaust emission tests.* All vehicles subject to this subpart are tested for exhaust emissions. Necessary equipment and specifications appear in §§ 86.1509-84 through 86.1511-84.

(2) *Fuel and analytical gas specifications.* Fuel requirements for idle exhaust emission testing are specified in § 86.1513-84. Analytical gases are specified in § 86.1514-84.

§§ 86.1507-84—86.1508-84 [Reserved]

§ 86.1509-84 Exhaust gas sampling system.

(a) The exhaust gas sampling system shall transport the exhaust sample from the engine or vehicle tailpipe to the analysis system in such a manner as to maintain the integrity of the

sample constituents that are to be analyzed.

(b) The sample system shall supply a dry sample (i.e., water removed) to the analysis system.

(c) A CVS sampling system with bag analysis as specified in Subpart N is permitted. The inclusion of an additional raw CO_2 analyzer as specified in Subpart D is required if the CVS system is used in order to accurately determine the CVS dilution factor (D.F.). The heated sample line specified in Subpart D for raw emission measurements is not required for the raw CO_2 measurement.

(d) A raw exhaust sampling system as specified in Subpart D is permitted.

§ 86.1510-84 [Reserved]

§ 86.1511-84 Exhaust gas analysis system.

(a) Analyzers used for this subpart shall meet the following specifications.

(1) The analyzers used must have ranges such that

(i) The carbon monoxide (CO) idle standard specified in § 86.083-10 and § 86.083-11 for heavy-duty engines or vehicles will provide an analyzer response between 45 and 90 percent of full-scale deflection on the CO analyzer.

(2) The resolution of the readout device for the ranges specified in paragraph (a)(1) of this section shall be equal to or less than the following:

(i) 0.05 percent for a carbon monoxide analyzer, and

(3) For the ranges specified in paragraph (a)(1) of this section the precision shall be less than ±3 percent of full scale deflection. The precision is defined as 2 times the standard deviation of 5 repetitive responses to a given calibration gas.

(4) For the ranges specified in paragraph (a)(1) of this section, the mean response to a zero calibration gas shall not exceed ±3 percent of full scale during a one-hour period.

(5) For the ranges specified in paragraph (a)(1) of this section the mean calibration response shall be less than ±3 percent of full scale during a one hour period. The calibration response is defined as the analyzer response to a calibration gas after the analyzer has been spanned by the electrical spanning network at the beginning of the one hour period.

(6) The analyzer must respond to an instantaneous step change at the entrance to the sampling system with a response equal to 90 percent of that step change within 15 seconds or less on the ranges specified in paragraph (a)(1) of this section. The step change shall be at least 60 percent of full scale deflection.

(7) The interference gases listed shall individually or collectively produce an analyzer reading less than ±2 percent of full scale on the ranges specified in paragraph (a)(1) of this section.

Interference gas	Concentration	Applicable analyzer
CO_2	14 percent	CO
C_3H_8	1 percent	CO
H_2O	Saturated vapor at 200° F	CO
NO_x	1,000 ppm	CO
O_2	5 percent	CO

(8) The analyzer shall be able to meet the specifications in paragraph (a) of this section.

(i) After a 30 minute warm-up from the prevailing ambient conditions,

(ii) Between the ambient temperatures of −20° C and 45° C (−4° F to 113° F),

(iii) Between 0 to 85 percent relative humidity, and

(iv) During flow variations of ±50 percent.

(b) The following analysis systems are permitted when the analysis system is in a temperature controlled environment.

(1) A CVS sampling system with bag analysis as specified in Subpart N provided suitable corrections are used to convert dilute wet-basis results to raw dry-basis results. The inclusion of an additional raw CO_2 analyzer as specified in Subpart D is required if the CVS system is used in order to accurately determine the CVS dilution factor (D.F.).

(c) A raw exhaust analysis system as specified in Subpart D provided suitable corrections are used to convert raw wet-basis results to raw dry-basis results. Measurements made on a raw dry-basis do not need correction.

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§ 86.1512-84 [Reserved]

§ 86.1513-84 Fuel specifications.

Fuel meeting the engine or vehicle manufacturer's recommendations to the ultimate purchaser shall be used. Fuels meeting the specifications in § 86.1313-84 for heavy-duty engines or vehicles are permitted.

§ 86.1514-84 Analytical gases.

(a) *Analyzer gases.* (1) Calibration gases for the CO analyzer shall be single blends using nitrogen as the diluent.

(2) Ambient air may be used for zero gas provided it is treated to remove impurities or drawn from a source that would tend to minimize CO background levels (e.g., a large room with no vehicles, ambient air, etc.).

(b) Calibration gases shall be traceable to within 3 percent of NBS gas standards, or other standards which have been approved by the Administrator.

(c) Calibration gases shall be equivalent in concentration (±10%) to the standards specified in § 86.083-10 and § 86.083-11 for heavy-duty engines or vehicles.

(d) If the CVS sampling system is used, the analytical gases specified in Subpart N shall be used.

(e) If the raw sampling system (Subpart D) is used, the analytical gases specified in Subpart D shall be used.

§ 86.1515-84 [Reserved]

§ 86.1516-84 Calibration; frequency and overview.

(a) Calibrations shall be performed as specified in §§ 86.1518-84 through 86.1526-84.

(b) At least weekly or after any maintenance which could alter calibration, check the calibration of the CO analyzer. Adjust or repair the analyzer as necessary.

(c) Water traps, filters, or conditioning columns should be checked at least daily.

(d) If the sampling and analysis procedures of Subpart D or N are used, the required calibrations and their frequencies are specified in their respective Subparts.

§§ 86.1517-84—86.1518-84 [Reserved]

§ 86.1519-84 CVS calibration.

If the CVS system is used for sampling during the idle emission test, the calibration instructions are specified in § 86.1319-84 of Subpart N.

§§ 86.1520-84—86.1521-84 [Reserved]

§ 86.1522-84 Carbon monoxide analyzer calibration.

(a) *Initial check.* (1) Follow the manufacturers instructions for instrument start-up and operation. Adjust the analyzer to optimize performance on the range specified in § 86.1511-84(a)(1).

(2) Calibrate the analyzer with the calibration gas specified in § 86.1514-84(c).

(3) Adjust the electrical span network such that the electrical span point is correct when the analyzer reads the calibration gas correctly.

(4) Determine that the analyzer complies with the specifications in § 86.1511-84.

(b) *Periodic check.* Follow paragraphs (a) (1), (2), and (3) of this section as specified by § 86.1516-84(b). Adjust or repair the analyzer as necessary.

(c) If the analysis procedures of Subpart D or N are used, the required calibrations are specified in their respective Subparts.

§ 86.1523-84 [Reserved]

§ 86.1524-84 Carbon dioxide analyzer calibration.

(a) The calibration requirements for the dilute-sample carbon dioxide analyzer are specified in Subpart N.

(b) The calibration requirements for the raw carbon dioxide analyzer are specified in Subpart D.

(c) If another sampling and analyzing system is used that does not require carbon dioxide (CO_2) analysis, this section may be disregarded.

§ 86.1525-84 [Reserved]

§ 86.1526-84 Calibration of other equipment.

Other test equipment used for testing shall be calibrated as often as re-

quired by the manufacturer or as necessary according to good practice.

§ 86.1527-84 Idle test procedure; overview.

(a) The idle emission test procedure is designed to determine the raw concentration (in parts per million of carbon) of carbon monoxide in the exhaust flow at idle. The test procedure begins with a warm engine, required to be at the normal operating temperature. (For example, the warm-up for an engine may be a transient dynamometer test, or for a vehicle it may be any convenient operation).

(b) *Vehicles.* (1) If the idle test is being performed on a vehicle, all emission control systems shall be intact and functioning.

(c) *Engines.* (1) If the idle test is being performed on an engine, the required engine configuration is specified in Subpart N.

§ 86.1528-84–86.1529-84 [Reserved]

§ 86.1530-84 Test sequence; general requirements.

The test sequence shown in Figure P83-1 shows the major steps encountered during the idle test described by the subsequent procedures. The average ambient temperature of the engine test cell (in the case of an engine dynamometer test) or the vehicle environment (in the case of a vehicle test) shall be between −20° C and 45° C (−4° F to 113° F).

START

Engine Warm-up, 5 minutes Min.
Engine Preconditioning, 30 seconds Min., 6 minutes Max.
Idle Stabilization, 30±5 seconds.
Idle Emission Test, 30±5 seconds.
End.

Figure P84-1—Test Sequence

§§ 86.1531-84–86.1536-84 [Reserved]

§ 86.1537-84 Idle test run.

(a) *Test run.* The following steps shall be taken for each test:

(1) Achieve normal engine operating parameters. The transient emission dynamometer test is an acceptable technique to warm-up the engine to normal operating parameters for an engine test. If the transient emission test is not performed prior to the idle emission test, the engine may be warmed-up according to § 86.1332-84(d)(1) (i) through (iii). For a vehicle test, sufficient vehicle operation shall take place to achieve normal operating parameters.

(2) Check the device(s) for removing water from the exhaust sample and the sample filter(s). Remove any water from the water trap(s). Clean and replace the filter(s) as necessary.

(3) Set the zero and span points of the CO analyzer with the electrical spanning network. It is permitted to set the analyzer span with calibration gases.

(4) Hook-up or attach the sampling system to the tailpipe of the engine or vehicle.

(5) Operate the engine at 2500±50 rpm and zero load for a minimum of 30 seconds and a maximum of 6 minutes.

(6) Operate the engine at curb idle for 30±5 seconds with the dynamometer off for the engine test, or the transmission in neutral (or park for automatic transmissions) for the vehicle tests.

(7) Sample the exhaust (after paragraph (a)6 of this section) for an additional 30±5 seconds for raw dry-basis CO in percent. The average value observed during this sample period shall be the value recorded.

(b) If the CVS sampling system is used, the following procedures apply:

(1) Warm-up the engine as specified in paragraph (a)(1) of this section.

(2) Precondition the engine as specified in paragraph (a)(5) of this section.

(3) With the sample selector valves in the "standby" position, connect evacuated sample collection bags to the dilute exhaust and dilution air sample collection systems.

(4) Start the CVS (if not already on), the sample pumps, the temperature recorder, the engine cooling fan, and the raw CO_2 analyzer. (The heat exchanger of the constant volume sampler, if used, shall be preheated to operating temperature before the test begins).

(5) Adjust the sample flow rates to the desired flow rate and set the gas flow measuring devices to zero.

(6) Operate the engine at the conditions specified in paragraph (a)(6) of this section.

(7) Begin CO bag sampling and raw CO_2 sampling.

(8) Sample idle emissions long enough to obtain a sufficient bag sample, but in no case shorter than 60 seconds nor longer than 6 minutes. Follow the sampling and exhaust measurements requirements of Subpart D for the conducting of the idle modes of the gasoline or diesel steady-state test for the raw CO_2 measurement.

(9) As soon as possible, transfer the idle test exhaust and dilution air samples to the analytical system and process the samples according to § 86.1540-84 obtaining a stablized reading of the exhaust sample on all analyzers within 20 minutes of the end of the sample collection phase of the test.

(10) Disconnect the exhaust tube from the engine tailpipe(s).

(11) The CVS may be turned off, if desired.

(c) If the raw exhaust sampling and analysis technique specified in Subpart D is used, the following procedures apply:

(1) Warm-up the engine as specified in paragraph (a)(1) of this section.

(2) Precondition the engine as specified in paragraph (a)(5) of this section.

(3) Operate the engine at the conditions specified in paragraph (a)(6) of this section.

(4) Follow the sampling and exhaust measurement requirements of Subpart D for conducting the idle modes.

(d) If the engine stalls at any time during the test run, the test is void.

§§ 86.1538-84—86.1539-84 [Reserved]

§ 86.1540-84 Idle exhaust sample analysis.

(a) Record the CO idle concentrations in percent.

(b) If the CVS sampling system is used, the analysis procedures for dilute CO and CO_2 specified in Subpart N apply. Follow the raw CO_2 analysis procedure specified in Subpart D for the raw CO_2 analyzer.

(c) If the continuous raw exhaust sampling technique (Subpart D) is used, the analysis procedures for CO specified in Subpart D apply.

§ 86.1541-84 [Reserved]

§ 86.1542-84 Information required.

(a) *General data.* The following information shall be recorded for each idle emission test:

(1) Vehicle identification number for a vehicle test.

(2) Engine identification number for an engine test.

(3) Engine family.

(4) Engine displacement.

(5) Analyzer operator(s).

(6) Vehicle (engine) operator(s).

(7) Fuel identification.

(8) Date of purchase of analytical equipment.

(9) Date of most recent analytical assembly calibration.

(10) All pertinent instrument information such as tuning, gain, serial numbers, detector number, calibration curve numbers, etc. As long as this information is traceable, it may be summarized by system number or analyzer identification numbers.

(11) *Pre-test data.* (i) Date and time of day.

(ii) Test number.

(iii) Ambient temperature (vehicle test) or engine intake air temperature (engine test).

(iv) Vehicle mileage or engine hours as applicable.

(12) *Test data.* (i) Curb idle speed during the test.

(ii) Idle exhaust CO concentration.

(b) If a CVS sampling system with bag analysis is used for the idle emission test, record the additional information specified in Subpart N as applicable. In addition, record the raw exhaust CO_2 concentration during the test.

(c) If the raw exhaust sampling and analysis system specified in Subpart D is used, record the additional information specified in Subpart D as applicable.

§ 86.1543-84 [Reserved]

§ 86.1544-84 Calculations; idle exhaust emissions.

(a) The final idle emission test results shall be reported as percent for carbon monoxide on a dry basis. The results shall be reported to the same number of significant digits as the idle

standards specified in § 86.084-10 and § 86.084-11.

(b) If a CVS sampling system is used, the following procedure shall apply:

(1) Use the procedures, as applicable, in Subpart N to determine the dilute wet-basis CO and CO_2 in percent.

(2) Use the procedure, as applicable, in Subpart D to determine the raw dry-basis CO_2 in percent.

(3) Convert the raw dry-basis CO_2 to raw wet-basis. An assumption that the percent of water by volume in the raw sample is equal to the percent of raw dry-basis CO_2 minus 0.5 percent is acceptable. For example:

10.0% dry CO_2 − 0.5% = 9.5% water
(1.00 − 0.095) (10.0% dry CO_2) = 9.05% wet CO_2

(4) Calculate the CVS dilution factor (DF) by:

$$DF = \frac{\text{Raw wet } CO_2 - \text{background } CO_2}{\text{Dilute wet } CO_2 - \text{background } CO_2}$$

(5) Convert the dilute wet-basis CO to dilute dry-basis values. An assumption that the percent of water by volume in the sample bag is 2 percent is acceptable. For example:

dilute dry CO = (dilute wet CO)/(1.00 − 0.02)

(6) Calculate the raw dry-basis CO values by:

raw dry CO = (DF) (dilute dry CO)

(c) [Reserved]

(d) If the raw exhaust sampling and analysis system specified in Subpart D is used, the following procedure shall apply:

(1) Use the procedure, as applicable, in Subpart D to raw dry-basis CO and CO_2.

Subpart Q—Regulations for Altitude Performance Adjustments for New and In-Use Motor Vehicles and Engines

AUTHORITY: Secs. 215 and 301 of the Clean Air Act, as amended (42 U.S.C. 7550 and 7601).

SOURCE: 45 FR 66956, Oct. 8, 1980, unless otherwise noted.

§ 86.1601 General applicability.

This subpart applies to manufacturers of motor vehicles and motor vehicle engines (hereafter referred to as vehicles) which are subject to the requirements of Title II of the Clean Air Act. This subpart applies to the following vehicles:

(a) 1968 and later model year light-duty vehicles and light-duty trucks.

(b) 1970 and later model year heavy-duty engines built after December 31, 1969.

(c) 1978 and later model year motorcycles built after December 31, 1977.

§ 86.1602 Definitions.

The definitions provided in Subpart A also apply in this subpart. Additional definitions that apply in this subpart are as follow:

"Altitude performance adjustments" are adjustments or modifications made to vehicle, engine, or emission control functions in order to improve emission control performance at altitudes other than those for which the vehicles were designed.

"Low altitude" means any elevation less than or equal to 1,219 meters (4,000 feet).

"Manufacturer parts" are parts produced or sold by the manufacturer of the motor vehicle or motor vehicle engine.

§ 86.1603 General requirements.

(a) Manufacturers of vehicles specified in § 86.1601 shall submit to the Administrator for approval the following altitude performance adjustment instructions.

(1) Low-altitude adjustment instructions for vehicles certified to meet the appropriate high-altitude emission standards.

(2) High-altitude adjustment instructions for vehicles certified to meet the appropriate low-altitude emission standards.

(b) Manufacturers are not required to submit altitude adjustment instructions for vehicles equipped with systems or devices that compensate (in full or in part) the engine fuel metering system for air density changes. Manufacturers claiming this exemption must submit to the Administrator

for approval a notification of the claim specifying the affected vehicles. The notification must also describe the compensating system used.

(c) Manufacturers may request the Administrator to waive the application of this regulation for vehicles which potentially may never be operated at an altitude other than that for which they were designed (such as vehicles which are not offered for sale within the continental United States).

(d) Manufacturers shall meet the requirements of paragraph (a), according to the following schedule:

(1) Altitude adjustment instructions for all 1980 and earlier model year vehicles or engines shall be submitted to the Administrator within one (1) year of the effective date of this regulation.

(2) Altitude adjustment instructions for 1982 and later model year vehicles or engines shall be submitted to the Administrator within 30 days of the issuance of the certificate of conformity for those vehicles or engines. For vehicles or engines certified for the 1981 model year before the publication of this regulation, altitude adjustment instructions shall be submitted within 90 days of the publication of this regulation.

(e) Failure to submit altitude performance adjustment instructions in accordance with this section is a violation of Section 203(a)(3) of the Clean Air Act and may result in penalties as specified in Section 205 of the Clean Air Act. The Administrator may grant extensions of the schedule in paragraph (c) if the manufacturer submits a written request to the Administrator specifying the reasons for the need for the extension. Requests for an extension must be received by EPA at least 5 working days prior to the submittal date contained in paragraph (d).

(f) The adjustment instructions (including labels) that the Administrator approves under this subpart shall be made available by the manufacturer at no cost to service outlets and the general public. EPA encourages manufacturers to notify vehicle owners in high-altitude areas of the availability of high-altitude adjustments.

(g) If altitude adjustments are performed according to the instructions approved by the Administrator, they will not be treated as violations of the tampering provisions of Section 203(a) of the Act except as described below:

§ 86.1604 Conditions for disapproval.

(a) The Administrator shall not approve altitude performance adjustments that will:

(1) Cause any regulated pollutant emission level to increase if the emission level exceeded the appropriate emission standard before adjustment was made.

(2) Cause any regulated pollutant emission level to exceed the appropriate emission standard if the emission level did not exceed the emission standard before the adjustment was made.

(3) For light-duty vehicles, light-duty trucks, motorcycles, heavy-duty gasoline-fueled engines, cause any reduction of vehicle performance (as evaluated by the manufacturer) such that vehicle drivers will likely complain.

(4) Be of such technical complexity or require such complex, expensive, or exclusive equipment that a competent mechanic in an average service establishment cannot perform the adjustments correctly. Adjustment procedures should not require knowledge or training beyond that required to perform normal engine maintenance. All required equipment must be available to any service establishment at competitive cost.

(5) Require the use of manufacturer parts, unless they are necessary to ensure emission control performance and unless the Administrator grants a waiver under Section 207(c)(3)(B) of the Act.

(6) Removes or defeats the parameter adjustment controls for the parameters listed in §§ 86.081-22(e)(1)(i) and 86.082-22(e)(1)(i) for light-duty vehicles and light-duty trucks, and § 86.428-80(d) for motorcycles unless:

(i) The manufacturer determines that it is reasonable to restore the parameter adjustment control in use and provides appropriate instruction as part of the high-altitude performance adjustment instructions, or

(ii) The manufacturer determines that is is not reasonable to restore the

parameter adjustment control in use and alternatively includes on the label required in § 86.1606 a statement to the effect that the labeled vehicle can be adjusted but that adjustment to other than manufacturer specification may be considered violation of Federal law.

(b) If the Administrator determines that the altitude performance adjustment instructions cannot be approved, the Administrator shall notify the manufacturer in writing of the disapproval. This notification shall explain the reasons for the disapproval.

(1) Within 20 working days of the date of a notification of disapproval, the manufacturer may file a written appeal to the Administrator. The Administrator may allow additional oral or written testimony prior to rendering a final decision.

(2) If the manufacturer files no appeal with the Administrator, the disapproval becomes final.

(3) Within 30 days following the Administrator's final decision of disapproval, the manufacturer must submit new altitude performance adjustment instructions applying to all of the vehicles for which the disapproved instructions applied. If these new instructions are not submitted within 30 days, EPA may take action under Sections 203(a)(3) and 205 of the Act. If the new altitude performance adjustment instructions are disapproved by the Administrator, the manufacturer may follow the appeal procedures under paragraphs (b)(1) and (b)(2) of this section.

(c) If the Administrator makes a final decision to disapprove the new instructions, EPA may take action under Sections 203(a)(3) and 205 of the Act.

§ 86.1605 Information to be submitted.

(a) Manufacturers shall submit to the Administrator the text of the altitude performance adjustment instructions to be provided to vehicle owners and service establishments. Each set of altitude performance adjustment instructions must set forth the adjustment procedure (including the installation of the label required by § 86.1606) to be followed and identify the vehicles for which the instructions are applicable. At a minimum, each set of instructions shall identify the vehicle applicability by manufacturer, car line, model year, engine displacement, engine family, and exhaust emission control systems. Manufacturers may specify vehicle applicability in greater detail if necessary, but such specifications must be identifiable to the public and the service industry through vehicle marking or codes.

(b) The manufacturer shall submit to the Administrator the following information about the adjustments:

(1) Specifications of changes in calibrations of any component, including the original and new calibration values or curves;

(2) Descriptions of component additions, including a full description of the new components along with the configurations (sketch or drawing), calibration values, and part numbers;

(3) Descriptions of component replacements, including all items in paragraph (b)(2) of this section, for the new parts. Also, a description of the differences between the original component and the new component with respect to design, calibration, and function;

(4) Descriptions of any special tools necessary to perform the adjustments.

(c) The manufacturer shall submit to the Administrator the following evaluations of the adjustments:

(1) A statement that the conditions of § 86.1604 (a)(1) and (a)(2) are not caused by the adjustment, and supporting information for this statement consisting of technical evaluations (consistent with good engineering practice) or emission test data.

(2) A statement that vehicle performance is generally unchanged or improved as result of the adjustments, and supporting information for this statement consisting of technical evaluations or driver evaluations.

(3) Information that shows compliance with Section 202(a)(4)(A) of the Act (which prohibits vehicles from causing unreasonable risks to public health, welfare, and safety).

(d) The manufacturer shall submit to the Administrator for approval a copy or sample of the label required by § 86.1606 and a copy of the instructions for installation of the label.

§ 86.1606 Labeling.

(a) The manufacturer shall make available to the public as part of the altitude performance adjustment instructions the labels described in this section. Instructions for installing the labels according to the requirements of this section shall be provided with each label.

(b) The label installation instructions shall indicate the following information.

(1) For light-duty vehicles, light-duty trucks, and heavy-duty engines, the label should be affixed in a readily visible position in the engine compartment and beside (to the extent possible) the existing label which is required under § 86.079-35.

(2) For motorcycles, the label should be affixed in a readily accessible position and beside (to the extent possible) the existing label which is required under § 86.413-78(a)(1).

(3) The instructions shall also indicate that the label should not be affixed to any equipment that can be easily detached from the vehicle.

(c) The label must be constructed such that if installed properly, it cannot be removed without destroying or defacing the label.

(d) The label shall contain the following information lettered in the English language in block letters and numerals, which must be of a color that contrasts with the background of the label:

(1) The label heading: Vehicle Emission Control Information Update;

(2) Full corporate name and trademark of the vehicle manufactuer;

(3) The statement: "This vehicle has been (adjusted) (modified) to improve emission control performance when operated at (high) (low) altitude";

(4) Information on where altitude performance adjustment instructions may be obtained or include the actual altitude performance adjustment instructions;

(5) The new tuneup specifications (if changed from the original label specifications) at the applicable altitude.

APPENDICES

APPENDIX I—URBAN DYNAMOMETER SCHEDULES

(a) EPA Urban Dynamometer Driving Schedule for Light-Duty Vehicles and Light-Duty Trucks.

EPA URBAN DYNAMOMETER DRIVING SCHEDULE

[Speed versus Time Sequence]

Time (sec.)	Speed (m.p.h.)	Time (sec.)	Speed (m.p.h.)	Time (sec.)	Speed (m.p.h.)
0	0.0	1	0.0	2	0.0
3	0.0	4	0.0	5	0.0
6	0.0	7	0.0	8	0.0
9	0.0	10	0.0	11	0.0
12	0.0	13	0.0	14	0.0
15	0.0	16	0.0	17	0.0
18	0.0	19	0.0	20	0.0
21	3.0	22	5.9	23	8.6
24	11.5	25	14.3	26	16.9
27	17.3	28	18.1	29	20.7
30	21.7	31	22.4	32	22.5
33	22.1	34	21.5	35	20.9
36	20.4	37	19.8	38	17.0
39	14.9	40	14.9	41	15.2
42	15.5	43	16.0	44	17.1
45	19.1	46	21.1	47	22.7
48	22.9	49	22.7	50	22.6
51	21.3	52	19.0	53	17.1
54	15.8	55	15.8	56	17.7
57	19.8	58	21.6	59	23.2
60	24.2	61	24.6	62	24.9
63	25.0	64	24.6	65	24.5
66	24.7	67	24.8	68	24.7
69	24.6	70	24.6	71	25.1
72	25.6	73	25.7	74	25.4
75	24.9	76	25.0	77	25.4
78	26.0	79	26.0	80	25.7
81	26.1	82	26.7	83	27.5
84	28.6	85	29.3	86	29.8
87	30.1	88	30.4	89	30.7
90	30.7	91	30.5	92	30.4
93	30.3	94	30.4	95	30.8
96	30.4	97	29.9	98	29.5
99	29.8	100	30.3	101	30.7
102	30.9	103	31.0	104	30.9
105	30.4	106	29.8	107	29.9
108	30.2	109	30.7	110	31.2
111	31.8	112	32.2	113	32.4
114	32.2	115	31.7	116	28.6
117	25.3	118	22.0	119	18.7
120	15.4	121	12.1	122	8.8
123	5.5	124	2.2	125	0.0
126	0.0	127	0.0	128	0.0
129	0.0	130	0.0	131	0.0
132	0.0	133	0.0	134	0.0
135	0.0	136	0.0	137	0.0
138	0.0	139	0.0	140	0.0
141	0.0	142	0.0	143	0.0
144	0.0	145	0.0	146	0.0
147	0.0	148	0.0	149	0.0
150	0.0	151	0.0	152	0.0
153	0.0	154	0.0	155	0.0
156	0.0	157	0.0	158	0.0
159	0.0	160	0.0	161	0.0
162	0.0	163	0.0	164	3.3
165	6.6	166	9.9	167	13.2

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EPA URBAN DYNAMOMETER DRIVING SCHEDULE—Continued

[Speed versus Time Sequence]

Time (sec.)	Speed (m.p.h.)	Time (sec.)	Speed (m.p.h.)	Time (sec.)	Speed (m.p.h.)
166	16.5	169	19.8	170	22.2
171	24.3	172	25.8	173	26.4
174	25.7	175	25.1	176	24.7
177	25.0	178	25.2	179	25.4
180	25.8	181	27.2	182	26.5
183	24.0	184	22.7	185	19.4
186	17.7	187	17.2	188	18.1
189	18.6	190	20.0	191	22.2
192	24.5	193	27.3	194	30.5
195	33.5	196	36.2	197	37.3
198	39.3	199	40.5	200	42.1
201	43.5	202	45.1	203	46.0
204	46.8	205	47.5	206	47.5
207	47.3	208	47.2	209	47.0
210	47.0	211	47.0	212	47.0
213	47.0	214	47.2	215	47.4
216	47.9	217	48.5	218	49.1
219	49.5	220	50.0	221	50.6
222	51.0	223	51.5	224	52.2
225	53.2	226	54.1	227	54.6
228	54.9	229	55.0	230	54.9
231	54.6	232	54.6	233	54.8
234	55.1	235	55.5	236	55.7
237	56.1	238	56.3	239	56.6
240	56.7	241	56.7	242	56.5
243	56.5	244	56.5	245	56.5
246	56.5	247	56.5	248	56.4
249	56.1	250	55.8	251	55.1
252	54.6	253	54.2	254	54.0
255	53.7	256	53.6	257	53.9
258	54.0	259	54.1	260	54.1
261	53.8	262	53.4	263	53.0
264	52.6	265	52.1	266	52.4
267	52.0	268	51.9	269	51.7
270	51.5	271	51.6	272	51.8
273	52.1	274	52.5	275	53.0
276	53.5	277	54.0	278	54.9
279	55.4	280	55.6	281	56.0
282	56.0	283	55.8	284	55.2
285	54.5	286	53.6	287	52.5
288	51.5	289	51.5	200	51.5
291	51.1	292	50.1	293	50.0
294	50.1	295	50.0	296	49.6
297	49.5	298	49.5	299	49.5
300	49.1	301	48.6	302	48.1
303	47.2	304	46.1	305	45.0
306	43.8	307	42.6	308	41.5
309	40.3	310	38.5	311	37.0
312	35.2	313	33.8	314	32.5
315	31.5	316	30.6	317	30.5
318	30.0	319	29.0	320	27.5
321	24.8	322	21.5	323	20.1
324	19.1	325	18.5	326	17.0
327	15.5	328	12.5	329	10.8
330	8.0	331	4.7	332	1.4
333	0.0	334	0.0	335	0.0
336	0.0	337	0.0	338	0.0
339	0.0	340	0.0	341	0.0
342	0.0	343	0.0	344	0.0
345	0.0	346	0.0	347	1.0
348	4.3	349	7.6	350	10.9
351	14.2	352	17.3	353	20.0
354	22.5	355	23.7	356	25.2
357	26.6	358	28.1	359	30.0
360	30.8	361	31.6	362	32.1
363	32.8	364	33.6	365	34.5
366	34.6	367	34.9	368	34.8

EPA URBAN DYNAMOMETER DRIVING SCHEDULE—Continued

[Speed versus Time Sequence]

Time (sec.)	Speed (m.p.h.)	Time (sec.)	Speed (m.p.h.)	Time (sec.)	Speed (m.p.h.)
369	34.5	370	34.7	371	35.5
372	36.0	373	36.0	374	36.0
375	36.0	376	36.0	377	36.0
378	36.1	379	36.4	380	36.5
381	36.4	382	36.0	383	35.1
384	34.1	385	33.5	386	31.4
387	29.0	388	25.7	389	23.0
390	20.3	391	17.5	392	14.5
393	12.0	394	8.7	395	5.4
396	2.1	397	0.0	398	0.0
399	0.0	400	0.0	401	0.0
402	0.0	403	2.6	404	5.9
405	9.2	406	12.5	407	15.8
408	19.1	409	22.4	410	25.0
411	25.6	412	27.5	413	29.0
414	30.0	415	30.1	416	30.0
417	29.7	418	29.3	419	28.8
420	28.0	421	25.0	422	21.7
423	18.4	424	15.1	425	11.8
426	8.5	427	5.2	428	1.9
429	0.0	430	0.0	431	0.0
432	0.0	433	0.0	434	0.0
435	0.0	436	0.0	437	0.0
438	0.0	439	0.0	440	0.0
441	0.0	442	0.0	443	0.0
444	0.0	445	0.0	446	0.0
447	0.0	448	3.3	449	6.6
450	9.9	451	13.2	452	16.5
453	19.8	454	23.1	455	26.4
456	27.8	457	29.1	458	31.5
459	33.0	460	33.6	461	34.8
462	35.1	463	35.6	464	36.1
465	36.0	466	36.1	467	36.2
468	36.0	469	35.7	470	36.0
471	36.0	472	35.6	473	35.5
474	35.4	475	35.2	476	35.2
477	35.2	478	35.2	479	35.2
480	35.2	481	35.0	482	35.1
483	35.2	484	35.5	485	35.2
486	35.0	487	35.0	488	35.0
489	34.8	490	34.6	491	34.5
492	33.5	493	32.0	494	30.1
495	28.0	496	25.5	497	22.5
498	19.8	499	16.5	500	13.2
501	10.3	502	7.2	503	4.0
504	1.0	505	0.0	506	0.0
507	0.0	508	0.0	509	0.0
510	0.0	511	1.2	512	3.5
513	5.5	514	6.5	515	8.5
516	9.6	517	10.5	518	11.9
519	14.0	520	16.0	521	17.7
522	19.0	523	20.1	524	21.0
525	22.0	526	23.0	527	23.8
528	24.5	529	24.9	530	25.0
531	25.0	532	25.0	533	25.0
534	25.0	535	25.0	536	25.6
537	25.8	538	26.0	539	25.6
540	25.2	541	25.0	542	25.0
543	25.0	544	24.4	545	23.1
546	19.8	547	16.5	548	13.2
549	9.9	550	6.6	551	3.3
552	0.0	553	0.0	554	0.0
555	0.0	556	0.0	557	0.0
558	0.0	559	0.0	560	0.0
561	0.0	562	0.0	563	0.0
564	0.0	565	0.0	566	0.0
567	0.0	568	0.0	569	3.3

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EPA URBAN DYNAMOMETER DRIVING SCHEDULE—Continued

[Speed versus Time Sequence]

Time (sec.)	Speed (m.p.h.)	Time (sec.)	Speed (m.p.h.)	Time (sec.)	Speed (m.p.h.)
570	6.6	571	9.9	572	13.0
573	14.6	574	16.0	575	17.0
576	17.0	577	17.0	578	17.5
579	17.7	580	17.7	581	17.5
582	17.0	583	16.9	584	16.6
585	17.0	586	17.1	587	17.0
588	16.6	589	16.5	590	16.5
591	16.6	592	17.0	593	17.6
594	18.5	595	19.2	596	20.2
597	21.0	598	21.1	599	21.2
600	21.6	601	22.0	602	22.4
603	22.5	604	22.5	605	22.5
606	22.7	607	23.7	608	25.1
609	26.0	610	26.5	611	27.0
612	26.1	613	22.8	614	19.5
615	16.2	616	12.9	617	9.6
618	6.3	619	3.0	620	0.0
621	0.0	622	0.0	623	0.0
624	0.0	625	0.0	626	0.0
627	0.0	628	0.0	629	0.0
630	0.0	631	0.0	632	0.0
633	0.0	634	0.0	635	0.0
636	0.0	637	0.0	638	0.0
639	0.0	640	0.0	641	0.0
642	0.0	643	0.0	644	0.0
645	0.0	646	2.0	647	4.5
648	7.8	649	10.2	650	12.5
651	14.0	652	15.3	653	17.5
654	19.6	655	21.0	656	22.2
657	23.3	658	24.5	659	25.3
660	25.6	661	26.0	662	26.1
663	26.2	664	26.2	665	26.4
666	26.5	667	26.5	668	26.0
669	25.5	670	23.6	671	21.4
672	18.5	673	16.4	674	14.5
675	11.6	676	8.7	677	5.8
678	3.5	679	2.0	680	0.0
681	0.0	682	0.0	683	0.0
684	0.0	685	0.0	686	0.0
687	0.0	688	0.0	689	0.0
690	0.0	691	0.0	692	0.0
693	0.0	694	1.4	695	3.3
696	4.4	697	6.5	698	9.2
699	11.3	700	13.5	701	14.6
702	16.4	703	16.7	704	16.5
705	16.5	706	18.2	707	19.2
708	20.1	709	21.5	710	22.5
711	22.5	712	22.1	713	22.7
714	23.3	715	23.5	716	22.5
717	21.6	718	20.5	719	18.0
720	15.0	721	12.0	722	9.0
723	6.2	724	4.5	725	3.0
726	2.1	727	0.5	728	0.5
729	3.2	730	6.5	731	9.6
732	12.5	733	14.0	734	16.0
735	18.0	736	19.6	737	21.5
738	23.1	739	24.5	740	25.5
741	26.5	742	27.1	743	27.6
744	27.9	745	28.3	746	28.6
747	28.6	748	28.3	749	28.2
750	28.0	751	27.5	752	26.8
753	25.5	754	23.5	755	21.5
756	19.0	757	16.5	758	14.9
759	12.5	760	9.4	761	6.2
762	3.0	763	1.5	764	1.5
765	0.5	766	0.0	767	3.0
768	6.3	769	9.6	770	12.9

EPA URBAN DYNAMOMETER DRIVING SCHEDULE—Continued

[Speed versus Time Sequence]

Time (sec.)	Speed (m.p.h.)	Time (sec.)	Speed (m.p.h.)	Time (sec.)	Speed (m.p.h.)
771	15.8	772	17.5	773	18.4
774	19.5	775	20.7	776	22.0
777	23.2	778	25.0	779	26.5
780	27.5	781	28.0	782	28.3
783	28.9	784	28.9	785	28.9
786	28.8	787	28.5	788	28.3
789	28.3	790	28.3	791	28.2
792	27.6	793	27.5	794	27.5
795	27.5	796	27.5	797	27.5
798	27.5	799	27.6	800	28.0
801	28.5	802	30.0	803	31.0
804	32.0	805	33.0	806	33.0
807	33.6	808	34.0	809	34.3
810	34.2	811	34.0	812	34.0
813	33.9	814	33.6	815	33.1
816	33.0	817	32.5	818	32.0
819	31.9	820	31.6	821	31.5
822	30.6	823	30.0	824	29.9
825	29.9	826	29.9	827	29.9
828	29.6	829	29.5	830	29.5
831	29.3	832	28.9	833	28.2
834	27.7	835	27.0	836	25.5
837	23.7	838	22.0	839	20.5
840	19.2	841	19.2	842	20.1
843	20.9	844	21.4	845	22.0
846	22.6	847	23.2	848	24.0
849	25.0	850	26.0	851	26.6
852	26.6	853	26.8	854	27.0
855	27.2	856	27.8	857	28.1
858	28.8	859	28.9	860	29.0
861	29.1	862	29.0	863	28.1
864	27.5	865	27.0	866	25.8
867	25.0	868	24.5	869	24.8
870	25.1	871	25.5	872	25.7
873	26.2	874	26.9	875	27.5
876	27.8	877	28.4	878	29.0
879	29.2	880	29.1	881	29.0
882	28.9	883	28.5	884	28.1
885	28.0	886	28.0	887	27.6
888	27.2	889	26.6	890	27.0
891	27.5	892	27.8	893	28.0
894	27.8	895	28.0	896	28.0
897	28.0	898	27.7	899	27.4
900	26.9	901	26.6	902	26.5
903	26.5	904	26.5	905	26.3
906	26.2	907	26.2	908	25.9
909	25.6	910	25.6	911	25.9
912	25.8	913	25.5	914	24.6
915	23.5	916	22.2	917	21.6
918	21.6	919	21.7	920	22.6
921	23.4	922	24.0	923	24.2
924	24.4	925	24.9	926	25.1
927	25.2	928	25.3	929	25.5
930	25.2	931	25.0	932	25.0
933	25.0	934	24.7	935	24.5
936	24.3	937	24.3	938	24.5
939	25.0	940	25.0	941	24.6
942	24.6	943	24.1	944	24.5
945	25.1	946	25.6	947	25.1
948	24.0	949	22.0	950	20.1
951	16.9	952	13.6	953	10.3
954	7.0	955	3.7	956	0.4
957	0.0	958	0.0	959	0.0
960	2.0	961	5.0	962	8.6
963	11.9	964	15.2	965	17.5
966	18.6	967	20.0	968	21.1
969	22.0	970	23.0	971	24.5

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EPA URBAN DYNAMOMETER DRIVING SCHEDULE—Continued

[Speed versus Time Sequence]

Time (sec.)	Speed (m.p.h.)	Time (sec.)	Speed (m.p.h.)	Time (sec.)	Speed (m.p.h.)
972	26.3	973	27.5	974	28.1
975	28.4	976	28.5	977	28.5
978	28.5	979	27.7	980	27.5
981	27.2	982	26.8	983	26.5
984	26.0	985	25.7	986	25.2
987	24.0	988	22.0	989	21.5
990	21.5	991	21.8	992	22.5
993	23.0	994	22.8	995	22.8
996	23.0	997	22.7	998	22.7
999	22.7	1000	23.5	1001	24.0
1002	24.6	1003	24.8	1004	25.1
1005	25.5	1006	25.6	1007	25.5
1008	25.0	1009	24.1	1010	23.7
1011	23.2	1012	22.9	1013	22.5
1014	22.0	1015	21.6	1016	20.5
1017	17.5	1018	14.2	1019	10.9
1020	7.6	1021	4.3	1022	1.0
1023	0.0	1024	0.0	1025	0.0
1026	0.0	1027	0.0	1028	0.0
1029	0.0	1030	0.0	1031	0.0
1032	0.0	1033	0.0	1034	0.0
1035	0.0	1036	0.0	1037	0.0
1038	0.0	1039	0.0	1040	0.0
1041	0.0	1042	0.0	1043	0.0
1044	0.0	1045	0.0	1046	0.0
1047	0.0	1048	0.0	1049	0.0
1050	0.0	1051	0.0	1052	0.0
1053	1.2	1054	4.0	1055	7.3
1056	10.6	1057	13.9	1058	17.0
1059	18.5	1060	20.0	1061	21.8
1062	23.0	1063	24.0	1064	24.8
1065	25.6	1066	26.5	1067	26.8
1068	27.4	1069	27.9	1070	28.3
1071	28.0	1072	27.5	1073	27.0
1074	27.0	1075	26.3	1076	24.5
1077	22.5	1078	21.5	1079	20.6
1080	18.0	1081	15.0	1082	12.3
1083	11.1	1084	10.6	1085	10.0
1086	9.5	1087	9.1	1088	8.7
1089	8.6	1090	8.8	1091	9.0
1092	8.7	1093	8.6	1094	8.0
1095	7.0	1096	5.0	1097	4.2
1098	2.6	1099	1.0	1100	0.0
1101	0.1	1102	0.6	1103	1.6
1104	3.6	1105	6.9	1106	10.0
1107	12.8	1108	14.0	1109	14.5
1110	16.0	1111	18.1	1112	20.0
1113	21.0	1114	21.2	1115	21.3
1116	21.4	1117	21.7	1118	22.5
1119	23.0	1120	23.8	1121	24.5
1122	25.0	1123	24.9	1124	24.8
1125	25.0	1126	25.4	1127	25.8
1128	26.0	1129	26.4	1130	26.6
1131	26.9	1132	27.0	1133	27.0
1134	27.0	1135	26.9	1136	26.8
1137	26.8	1138	26.5	1139	26.4
1140	26.0	1141	25.5	1142	24.6
1143	23.5	1144	21.5	1145	20.0
1146	17.5	1147	16.0	1148	14.0
1149	10.7	1150	7.4	1151	4.1
1152	0.8	1153	0.0	1154	0.0
1155	0.0	1156	0.0	1157	0.0
1158	0.0	1159	0.0	1160	0.0
1161	0.0	1162	0.0	1163	0.0
1164	0.0	1165	0.0	1166	0.0
1167	0.0	1168	0.0	1169	2.1
1170	5.4	1171	8.7	1172	12.0

EPA URBAN DYNAMOMETER DRIVING SCHEDULE—Continued

[Speed versus Time Sequence]

Time (sec.)	Speed (m.p.h.)	Time (sec.)	Speed (m.p.h.)	Time (sec.)	Speed (m.p.h.)
1173	15.3	1174	18.6	1175	21.1
1176	23.0	1177	23.5	1178	23.0
1179	22.5	1180	20.0	1181	16.7
1182	13.4	1183	10.1	1184	6.8
1185	3.5	1186	0.2	1187	0.0
1188	0.0	1189	0.0	1190	0.0
1191	0.0	1192	0.0	1193	0.0
1194	0.0	1195	0.0	1196	0.0
1197	0.2	1198	1.5	1199	3.5
1200	6.5	1201	9.8	1202	12.0
1203	12.9	1204	13.0	1205	12.6
1206	12.8	1207	13.1	1208	13.1
1209	14.0	1210	15.5	1211	17.0
1212	18.6	1213	19.7	1214	21.0
1215	21.5	1216	21.8	1217	21.8
1318	21.5	1219	21.2	1220	21.5
1221	21.8	1222	22.0	1223	21.9
1224	21.7	1225	21.5	1226	21.5
1227	21.4	1228	20.1	1229	19.5
1230	19.2	1231	19.6	1232	19.8
1233	20.0	1234	19.5	1235	17.5
1236	15.5	1237	13.0	1238	10.0
1239	8.0	1240	6.0	1241	4.0
1242	2.5	1243	0.7	1244	0.0
1245	0.0	1246	0.0	1247	0.0
1248	0.0	1249	0.0	1250	0.0
1251	0.0	1252	1.0	1253	1.0
1254	1.0	1255	1.0	1256	1.0
1257	1.6	1258	3.0	1259	4.0
1260	5.0	1261	6.3	1262	8.0
1263	10.0	1264	10.5	1265	9.5
1266	8.5	1267	7.6	1268	8.8
1269	11.0	1270	14.0	1271	17.0
1272	19.5	1273	21.0	1274	21.8
1275	22.2	1276	23.0	1277	23.6
1278	24.1	1279	24.5	1280	24.5
1281	24.0	1282	23.5	1283	23.5
1284	23.5	1285	23.5	1286	23.5
1287	23.5	1288	24.0	1289	24.1
1290	24.5	1291	24.7	1292	25.0
1293	25.4	1294	25.6	1295	25.7
1296	26.0	1297	26.2	1298	27.0
1299	27.8	1300	28.3	1301	29.0
1302	29.1	1303	29.0	1304	28.0
1305	24.7	1306	21.4	1307	18.1
1308	14.8	1309	11.5	1310	8.2
1311	4.9	1312	1.6	1313	0.0
1314	0.0	1315	0.0	1316	0.0
1317	0.0	1318	0.0	1319	0.0
1320	0.0	1321	0.0	1322	0.0
1323	0.0	1324	0.0	1325	0.0
1326	0.0	1327	0.0	1328	0.0
1329	0.0	1330	0.0	1331	0.0
1332	0.0	1333	0.0	1334	0.0
1335	0.0	1336	0.0	1337	0.0
1338	1.5	1339	4.8	1340	8.1
1341	11.4	1342	13.2	1343	15.1
1344	16.8	1345	18.8	1346	19.5
1347	20.3	1348	21.3	1349	21.9
1350	22.1	1351	22.4	1352	22.0
1353	21.6	1354	21.1	1355	20.5
1356	20.0	1357	19.6	1358	18.5
1359	17.5	1360	16.5	1361	15.5
1362	14.0	1363	11.0	1364	8.0
1365	5.2	1366	2.5	1367	0.0
1368	0.0	1369	0.0	1370	0.0

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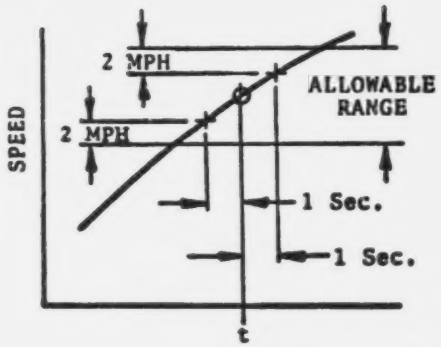
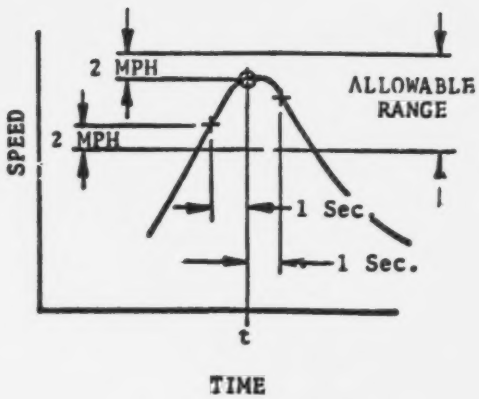
EPA URBAN DYNAMOMETER DRIVING SCHEDULE—Continued

[Speed versus Time Sequence]

Time (sec.)	Speed (m.p.h.)	Time (sec.)	Speed (m.p.h.)	Time (sec.)	Speed (m.p.h.)
1371	0.0	1372	0.0		

The diagrams below show the range of acceptable speed tolerances for typical points. The curve on the left is typical of portions of the speed curve which are increasing or decreasing throughout the 2 second time interval. The curve on the right is typical of portions of the speed curve which include a maximum or minimum value.





(b) EPA Urban Dynamometer Driving Schedule for Light-Duty Vehicles, Light-Duty Trucks, and Motorcycles with engine displacements equal to or greater than 170 cc (10.4 cu. in.).

SPEED VERSUS TIME SEQUENCE

Time (seconds)	Speed (kilometers per hour)
0	0
1	0
2	0
3	0
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	0
12	0
13	0
14	0
15	0
16	0
17	0
18	0
19	0
20	0
21	4.8
22	9.5
23	13.8
24	18.5
25	23.0
26	27.2
27	27.8
28	29.1
29	33.3
30	34.9
31	36.0
32	36.2
33	35.6
34	34.6
35	33.6
36	32.8
37	31.9
38	27.4
39	24.0
40	24.0
41	24.5
42	24.9
43	25.7
44	27.5
45	30.7
46	34.0
47	36.5
48	36.9
49	36.5
50	36.4
51	34.3
52	30.6
53	27.5
54	25.4
55	25.4
56	28.5
57	31.9
58	34.8
59	37.3
60	38.9
61	39.6
62	40.1
63	40.2
64	39.6
65	39.4
66	39.8
67	39.9
68	39.8

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SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
69	39.6
70	39.6
71	40.4
72	41.2
73	41.4
74	40.9
75	40.1
76	40.2
77	40.9
78	41.8
79	41.8
80	41.4
81	42.0
82	43.0
83	44.3
84	46.0
85	47.2
86	48.0
87	48.4
88	48.9
89	49.4
90	49.4
91	49.1
92	48.9
93	48.8
94	48.9
95	49.6
96	48.9
97	48.1
98	47.5
99	48.0
100	48.8
101	49.4
102	49.7
103	49.9
104	49.7
105	48.9
106	48.0
107	48.1
108	48.6
109	49.4
110	50.2
111	51.2
112	51.8
113	52.1
114	51.8
115	51.0
116	46.0
117	40.7
118	35.4
119	30.1
120	24.8
121	19.5
122	14.2
123	8.9
124	3.5
125	0
126	0
127	0
128	0
129	0
130	0
131	0
132	0
133	0
134	0
135	0
136	0
137	0

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
138	0
139	0
140	0
141	0
142	0
143	0
144	0
145	0
146	0
147	0
148	0
149	0
150	0
151	0
152	0
153	0
154	0
155	0
156	0
157	0
158	0
159	0
160	0
161	0
162	0
163	0
164	5.3
165	10.6
166	15.9
167	21.2
168	26.6
169	31.9
170	35.7
171	39.1
172	41.5
173	42.5
174	41.4
175	40.4
176	39.8
177	40.2
178	40.6
179	40.9
180	41.5
181	43.8
182	42.6
183	38.6
184	36.5
185	31.2
186	28.5
187	27.7
188	29.1
189	29.9
190	32.2
191	35.7
192	39.4
193	43.9
194	49.1
195	53.9
196	58.3
197	60.0
198	63.2
199	65.2
200	67.8
201	70.0
202	72.6
203	74.0
204	75.3
205	76.4
206	76.4

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SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
207	76.1
208	76.0
209	75.6
210	75.6
211	75.6
212	75.6
213	75.6
214	76.0
215	76.3
216	77.1
217	78.1
218	79.0
219	79.7
220	80.5
221	81.4
222	82.1
223	82.9
224	84.0
225	85.6
226	87.1
227	87.9
228	88.4
229	88.5
230	88.4
231	87.9
232	87.9
233	88.2
234	88.7
235	89.3
236	89.6
237	90.3
238	90.6
239	91.1
240	91.2
241	91.2
242	90.9
243	90.9
244	90.9
245	90.9
246	90.9
247	90.9
248	90.8
249	90.3
250	89.8
251	88.7
252	87.9
253	87.2
254	86.9
255	86.4
256	86.3
257	86.7
258	86.9
259	87.1
260	87.1
261	86.6
262	85.9
263	85.3
264	84.7
265	83.8
266	84.3
267	83.7
268	83.5
269	83.2
270	82.9
271	83.0
272	83.4
273	83.8
274	84.5
275	85.3

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
276	86.1
277	86.9
278	88.4
279	89.2
280	89.5
281	90.1
282	90.1
283	89.8
284	88.8
285	87.7
286	86.3
287	84.5
288	82.9
289	82.9
290	82.9
291	82.2
292	80.6
293	80.5
294	80.6
295	80.5
296	79.8
297	79.7
298	79.7
299	79.7
300	79.0
301	78.2
302	77.4
303	76.0
304	74.2
305	72.4
306	70.5
307	68.6
308	66.8
309	64.9
310	62.0
311	59.5
312	56.6
313	54.4
314	52.3
315	50.7
316	49.2
317	49.1
318	48.3
319	46.7
320	44.3
321	39.9
322	34.6
323	32.3
324	30.7
325	29.8
326	27.4
327	24.9
328	20.1
329	17.4
330	12.9
331	7.6
332	2.3
333	0
334	0
335	0
336	0
337	0
338	0
339	0
340	0
341	0
342	0
343	0
344	0

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SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
345	0
346	0
347	1.6
348	6.9
349	12.2
350	17.5
351	22.9
352	27.8
353	32.2
354	36.2
355	38.1
356	40.6
357	42.8
358	45.2
359	48.3
360	49.6
361	50.9
362	51.7
363	52.3
364	54.1
365	55.5
366	55.7
367	56.2
368	56.0
369	55.5
370	55.8
371	57.1
372	57.9
373	57.9
374	57.9
375	57.9
377	57.9
376	57.9
378	58.1
379	58.6
380	58.7
381	58.6
382	57.9
383	56.5
384	54.9
385	53.9
386	50.5
387	46.7
388	41.4
389	37.0
390	32.7
391	28.2
392	23.3
393	19.3
394	14.0
395	8.7
396	3.4
397	0
398	0
399	0
400	0
401	0
402	0
403	4.2
404	9.5
405	14.5
406	20.1
407	25.4
408	30.7
409	36.0
410	40.2
411	41.2
412	44.3
413	46.7

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
414	48.3
415	48.4
416	48.3
417	47.8
418	47.2
419	46.3
420	45.1
421	40.2
422	34.9
423	29.6
424	24.3
425	19.0
426	13.7
427	8.4
428	3.1
429	0
430	0
431	0
432	0
433	0
434	0
435	0
436	0
437	0
438	0
439	0
440	0
441	0
442	0
443	0
444	0
445	0
446	0
447	0
448	5.3
449	10.6
450	15.9
451	21.2
452	26.6
453	31.0
454	37.2
455	42.5
456	44.7
457	46.8
458	50.7
459	53.1
460	54.1
461	56.0
462	56.5
463	57.3
464	58.1
465	57.9
466	58.1
467	58.3
468	57.9
469	57.5
470	57.9
471	57.9
472	57.3
473	57.1
474	57.0
475	56.6
476	56.6
477	56.6
478	56.6
479	56.6
480	56.6
481	56.3
482	56.5

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SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
483	56.6
484	57.1
485	56.6
486	56.3
487	56.3
488	56.3
489	56.0
490	55.7
491	55.8
492	53.9
493	51.5
494	48.4
495	45.1
496	41.0
497	36.2
498	31.9
499	26.6
500	21.2
501	16.6
502	11.6
503	6.4
504	1.6
505	0
506	0
507	0
508	0
509	0
510	0
511	1.9
512	5.6
513	8.9
514	10.5
515	13.7
516	15.4
517	16.9
518	19.2
519	22.5
520	25.7
521	28.5
522	30.6
523	32.3
524	33.8
525	35.4
526	37.0
527	38.3
528	39.4
529	40.1
530	40.2
531	40.2
532	40.2
533	40.2
534	40.2
535	40.2
536	41.2
537	41.5
538	41.8
539	41.2
540	40.6
541	40.2
542	40.2
543	40.2
544	39.3
545	37.2
546	31.9
547	26.6
548	21.2
549	15.9
550	10.6
551	5.3

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
552	0
553	0
554	0
555	0
556	0
557	0
558	0
559	0
560	0
561	0
562	0
563	0
564	0
565	0
566	0
567	0
568	0
569	5.3
570	10.6
571	15.9
572	20.9
573	23.5
574	25.7
575	27.4
576	27.4
577	21.4
578	28.2
579	28.5
580	28.5
581	28.2
582	27.4
583	27.2
584	26.7
585	27.4
586	27.5
587	27.4
588	26.7
589	26.6
590	26.6
591	26.7
592	27.4
593	28.3
594	29.8
595	30.9
596	32.5
597	33.8
598	34.0
599	34.1
600	34.8
601	35.4
602	36.0
603	36.2
604	36.2
605	36.2
606	36.5
607	38.1
608	40.4
609	41.8
610	42.6
611	43.5
612	42.0
613	36.7
614	31.4
615	26.1
616	20.8
617	15.4
618	10.1
619	4.8
620	0

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SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
621	0
622	0
623	0
624	0
625	0
626	0
627	0
628	0
629	0
630	0
631	0
632	0
633	0
634	0
635	0
636	0
637	0
638	0
639	0
640	0
641	0
642	0
643	0
644	0
645	0
646	3.2
647	7.2
648	12.6
649	16.4
650	20.1
651	22.5
652	24.6
653	28.2
654	31.5
655	33.8
656	35.7
657	37.5
658	39.4
659	40.7
660	41.2
661	41.8
662	43.9
663	43.1
664	42.3
665	42.5
666	42.6
667	42.6
668	41.8
669	41.0
670	38.0
671	34.4
672	29.8
673	26.4
674	23.3
675	18.7
676	14.0
677	9.3
678	5.6
679	3.2
680	0
681	0
682	0
683	0
684	0
685	0
686	0
687	0
688	0
689	0

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
690	0
691	0
692	0
693	0
694	2.3
695	5.3
696	7.1
697	10.5
698	14.8
699	18.2
700	21.7
701	23.5
702	26.4
703	26.9
704	26.6
705	26.6
706	29.3
707	30.9
708	32.3
709	34.6
710	36.2
711	36.2
712	35.6
713	36.5
714	37.5
715	37.8
716	36.2
717	34.8
718	33.0
719	29.0
720	24.1
721	19.3
722	14.5
723	10.0
724	7.2
725	4.8
726	3.4
727	0.8
728	0.8
729	5.1
730	10.5
731	15.4
732	20.1
733	22.5
734	25.7
735	29.0
736	31.5
737	34.6
738	37.2
739	39.4
740	41.0
741	42.6
742	43.6
743	44.4
744	44.9
745	45.5
746	46.0
747	46.0
748	45.5
749	45.4
750	45.1
751	44.3
752	43.1
753	41.0
754	37.8
755	34.6
756	30.6
757	26.6
758	24.0

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SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
759	20.1
760	15.1
761	10.0
762	4.8
763	2.4
764	2.4
765	0.8
766	0
767	4.8
768	10.1
769	15.4
770	20.8
771	25.4
772	28.2
773	29.6
774	31.4
775	33.3
776	35.4
777	37.3
778	40.2
779	42.6
780	44.3
781	45.1
782	45.5
783	46.5
784	46.5
785	46.5
786	46.3
787	45.9
788	45.5
789	45.5
790	45.5
791	45.4
792	44.4
793	44.3
794	44.3
795	44.3
796	44.3
797	44.3
798	44.3
799	44.4
800	45.1
801	45.9
802	48.3
803	49.9
804	51.5
805	53.1
806	53.1
807	54.1
808	54.7
809	55.2
810	55.0
811	54.7
812	54.7
813	54.6
814	54.1
815	53.3
816	53.1
817	52.3
818	51.5
819	51.3
820	50.9
821	50.7
822	49.2
823	48.3
824	48.1
825	48.1
826	48.1
827	48.1

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
828	47.6
829	47.5
830	47.5
831	47.2
832	46.5
833	45.4
834	44.6
835	43.5
836	41.0
837	38.1
838	35.4
839	33.0
840	30.9
841	30.9
842	32.3
843	33.6
844	34.4
845	35.4
846	36.4
847	37.3
848	38.6
849	40.2
850	41.8
851	42.8
852	42.8
853	43.1
854	43.5
855	43.8
856	44.7
857	45.2
858	46.3
859	46.5
860	46.7
861	46.8
862	46.7
863	45.2
864	44.3
865	43.5
866	41.5
867	40.2
868	39.4
869	39.9
870	40.4
871	41.0
872	41.4
873	42.2
874	43.3
875	44.3
876	44.7
877	45.7
878	46.7
879	47.0
880	46.8
881	46.7
882	46.5
883	45.9
884	45.2
885	45.1
886	45.1
887	44.4
888	43.8
889	42.8
890	43.5
891	44.3
892	44.7
893	45.1
894	44.7
895	45.1
896	45.1

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SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
897	45.1
898	44.6
899	44.1
900	43.3
901	42.8
902	42.6
903	42.6
904	42.6
905	42.3
906	42.2
907	42.2
908	41.7
909	41.2
910	41.2
911	41.7
912	41.5
913	41.0
914	39.6
915	37.8
916	35.7
917	34.8
918	34.8
919	34.9
920	36.4
921	37.7
922	38.6
923	38.9
924	39.3
925	40.1
926	40.4
927	40.6
928	40.7
929	41.0
930	40.6
931	40.2
932	40.3
933	40.2
934	39.8
935	39.4
936	39.1
937	39.1
938	39.4
939	40.2
940	40.2
941	39.6
942	39.6
943	38.8
944	39.4
945	40.4
946	41.2
947	40.4
948	38.6
949	35.4
950	32.3
951	27.2
952	21.9
953	16.6
954	11.3
955	6.0
956	0.6
957	0
958	0
959	0
960	3.2
961	8.5
962	13.8
963	19.2
964	24.5
965	28.2

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
966	29.9
967	32.2
968	34.0
969	35.4
970	37.0
971	39.4
972	42.3
973	44.3
974	45.2
975	45.7
976	45.9
977	45.9
978	45.9
979	44.6
980	44.3
981	43.8
982	43.1
983	42.6
984	41.8
985	41.4
986	40.6
987	38.6
988	35.4
989	34.6
990	34.6
991	35.1
992	36.2
993	37.0
994	36.7
995	36.7
996	37.0
997	36.5
998	36.5
999	36.5
1,000	37.8
1,001	38.6
1,002	39.6
1,003	39.9
1,004	40.4
1,005	41.0
1,006	41.2
1,007	41.0
1,008	40.2
1,009	38.8
1,010	38.1
1,011	37.3
1,012	36.9
1,013	36.2
1,014	35.4
1,015	34.8
1,016	33.0
1,017	28.2
1,018	22.9
1,019	17.5
1,020	12.2
1,021	6.9
1,022	1.6
1,023	0
1,024	0
1,025	0
1,026	0
1,027	0
1,028	0
1,029	0
1,030	0
1,031	0
1,032	0
1,033	0
1,034	0

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SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
1,035	0
1,036	0
1,037	0
1,038	0
1,039	0
1,040	0
1,041	0
1,042	0
1,043	0
1,044	0
1,045	0
1,046	0
1,047	0
1,048	0
1,049	0
1,050	0
1,051	0
1,052	0
1,053	1.9
1,054	6.4
1,055	11.7
1,056	17.1
1,057	22.4
1,058	27.4
1,059	29.8
1,060	32.2
1,061	35.1
1,062	37.0
1,063	38.6
1,064	39.9
1,065	41.2
1,066	42.6
1,067	43.1
1,068	44.1
1,069	44.9
1,070	45.5
1,071	45.1
1,072	44.3
1,073	43.5
1,074	43.5
1,075	42.3
1,076	39.4
1,077	36.2
1,078	34.6
1,079	33.2
1,080	29.0
1,081	24.1
1,082	19.8
1,083	17.9
1,084	17.1
1,085	16.1
1,086	15.3
1,087	14.6
1,088	14.0
1,089	13.8
1,090	14.2
1,091	14.5
1,092	14.0
1,093	13.8
1,094	12.9
1,095	11.3
1,096	8.0
1,097	6.8
1,098	4.2
1,099	1.6
1,100	0
1,101	0.2
1,102	1.0
1,103	2.6

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
1,104	5.8
1,105	11.1
1,106	16.1
1,107	20.6
1,108	22.5
1,109	23.3
1,110	25.7
1,111	29.1
1,112	32.2
1,113	33.8
1,114	34.1
1,115	34.3
1,116	34.4
1,117	34.9
1,118	36.2
1,119	37.0
1,120	38.3
1,121	39.4
1,122	40.2
1,123	40.1
1,124	39.9
1,125	40.2
1,126	40.9
1,127	41.5
1,128	41.8
1,129	42.5
1,130	42.8
1,131	43.3
1,132	43.5
1,133	43.5
1,134	43.5
1,135	43.3
1,136	43.1
1,137	43.1
1,138	42.6
1,139	42.5
1,140	41.8
1,141	41.0
1,142	39.6
1,143	37.8
1,144	34.6
1,145	32.2
1,146	28.2
1,147	25.7
1,148	22.5
1,149	17.2
1,150	11.9
1,151	6.6
1,152	1.3
1,153	0
1,154	0
1,155	0
1,156	0
1,157	0
1,158	0
1,159	0
1,160	0
1,161	0
1,162	0
1,163	0
1,164	0
1,165	0
1,166	0
1,167	0
1,168	0
1,169	3.4
1,170	8.7
1,171	14.0
1,172	19.3

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SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
1,173	24.6
1,174	29.9
1,175	34.0
1,176	37.0
1,177	37.8
1,178	37.0
1,179	36.2
1,180	32.2
1,181	26.9
1,182	21.6
1,183	16.3
1,184	10.9
1,185	5.6
1,186	0.3
1,187	0
1,188	0
1,189	0
1,190	0
1,191	0
1,192	0
1,193	0
1,194	0
1,195	0
1,196	0
1,197	0.3
1,198	2.4
1,199	5.6
1,200	10.5
1,201	15.8
1,202	19.3
1,203	20.8
1,204	20.9
1,205	20.3
1,206	20.6
1,207	21.1
1,208	21.1
1,209	22.5
1,210	24.9
1,211	27.4
1,212	29.9
1,213	31.7
1,214	33.8
1,215	34.6
1,216	35.1
1,217	35.1
1,218	34.6
1,219	34.1
1,220	34.6
1,221	35.1
1,222	35.4
1,223	35.2
1,224	34.9
1,225	34.6
1,226	34.6
1,227	34.4
1,228	32.3
1,229	31.4
1,230	30.9
1,231	31.5
1,232	31.9
1,233	32.2
1,234	31.4
1,235	28.2
1,236	24.9
1,237	20.9
1,238	16.1
1,239	12.9
1,240	9.7
1,241	6.4

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
1,242	4.0
1,243	1.1
1,244	0
1,245	0
1,246	0
1,247	0
1,248	0
1,249	0
1,250	0
1,251	0
1,252	1.6
1,253	1.6
1,254	1.6
1,255	1.6
1,256	1.6
1,257	2.6
1,258	4.8
1,259	6.4
1,260	8.0
1,261	10.1
1,262	12.9
1,263	16.1
1,264	16.9
1,265	15.3
1,266	13.7
1,267	12.2
1,268	14.2
1,269	17.7
1,270	22.5
1,271	27.4
1,272	31.4
1,273	33.8
1,274	35.1
1,275	35.7
1,276	37.0
1,277	38.0
1,278	38.8
1,279	39.4
1,280	39.4
1,281	38.6
1,282	37.8
1,283	37.8
1,284	37.8
1,285	37.8
1,286	37.8
1,287	37.8
1,288	38.6
1,289	38.8
1,290	39.4
1,291	39.8
1,292	40.2
1,293	40.9
1,294	41.2
1,295	41.4
1,296	41.8
1,297	42.2
1,298	43.5
1,299	44.7
1,300	45.5
1,301	46.7
1,302	46.8
1,303	46.7
1,304	45.1
1,305	39.8
1,306	34.4
1,307	29.1
1,308	23.8
1,309	18.5
1,310	13.2

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SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
1,311	7.9
1,312	2.6
1,313	0
1,314	0
1,315	0
1,316	0
1,317	0
1,318	0
1,319	0
1,320	0
1,321	0
1,322	0
1,323	0
1,324	0
1,325	0
1,326	0
1,327	0
1,328	0
1,329	0
1,330	0
1,331	0
1,332	0
1,333	0
1,334	0
1,335	0
1,336	0
1,337	0
1,338	2.4
1,339	7.7
1,340	13.0
1,341	18.3
1,342	21.2
1,343	24.3
1,344	27.0
1,345	29.5
1,346	31.4
1,347	32.7
1,348	34.3
1,349	35.2
1,350	35.6
1,351	36.0
1,352	35.4
1,353	34.8
1,354	34.0
1,355	33.0
1,356	32.2
1,357	31.5
1,358	29.8
1,359	28.2
1,360	26.6
1,361	24.9
1,362	22.5
1,363	17.7
1,364	12.9
1,365	8.4
1,366	4.0
1,367	0
1,368	0
1,369	0
1,370	0
1,371	0

(c) EPA Urban Dynamometer Driving Schedule for motorcycles with engine displacements less than 170 cc (10.4 cu. in.).

SPEED VERSUS TIME SEQUENCE

SPEED VERSUS TIME SEQUENCE

Time (seconds)	Speed (kilometers per hour)
1	0
2	0
3	0
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	0
12	0
13	0
14	0
15	0
16	0
17	0
18	0
19	0
20	0
21	4.8
22	9.5
23	13.8
24	18.5
25	23.0
26	27.2
27	27.8
28	29.1
29	33.3
30	34.9
31	36.0
32	36.2
33	35.6
34	34.6
35	33.6
36	32.8
37	31.9
38	27.4
39	24.0
40	24.0
41	24.5
42	24.9
43	25.7
44	27.5
45	30.7
46	34.0
47	36.5
48	36.9
49	36.5
50	36.4
51	34.3
52	30.6
53	27.5
54	25.4
55	25.4
56	28.6
57	31.9
58	34.8
59	37.3
60	38.9
61	39.6
62	40.1
63	40.2
64	39.6
65	39.4
66	39.8

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SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
67	39.9
68	39.8
69	39.6
70	39.6
71	40.4
72	41.2
73	41.4
74	40.9
75	40.1
76	40.2
77	40.9
78	41.8
79	41.8
80	41.4
81	42.0
82	43.0
83	44.3
84	46.0
85	47.2
86	48.0
87	48.4
88	48.9
89	49.4
90	49.4
91	49.1
92	48.9
93	48.8
94	48.9
95	49.6
96	48.9
97	48.1
98	47.5
99	48.0
100	48.8
101	49.4
102	49.7
103	49.9
104	49.7
105	48.9
106	48.0
107	48.1
108	48.6
109	49.4
110	50.2
111	51.2
112	51.8
113	52.1
114	51.8
115	51.0
116	46.0
117	40.7
118	35.4
119	30.1
120	24.8
121	19.5
122	14.2
123	8.9
124	3.5
125	0
126	0
127	0
128	0
129	0
130	0
131	0
132	0
133	0
134	0
135	0

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
136	0
137	0
138	0
139	0
140	0
141	0
142	0
143	0
144	0
145	0
146	0
147	0
148	0
149	0
150	0
151	0
152	0
153	0
154	0
155	0
156	0
157	0
158	0
159	0
160	0
161	0
162	0
163	0
164	3.4
165	6.8
166	10.3
167	13.7
168	17.1
169	20.5
170	23.0
171	25.2
172	26.7
173	27.4
174	26.6
175	26.0
176	25.6
177	25.9
178	26.1
179	26.3
180	26.7
181	28.2
182	27.5
183	24.9
184	23.5
185	20.1
186	18.3
187	17.8
188	18.8
189	19.3
190	20.7
191	23.0
192	25.4
193	28.3
194	31.6
195	34.7
196	37.5
197	38.6
198	40.7
199	42.0
200	43.6
201	45.1
202	46.7
203	47.7
204	48.5

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SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
205	49.2
206	49.2
207	49.0
208	48.9
209	48.7
210	48.7
211	48.7
212	48.7
213	48.7
214	48.9
215	49.1
216	49.6
217	50.2
218	50.9
219	51.3
220	51.8
221	52.4
222	52.8
223	53.4
224	54.1
225	55.1
226	56.0
227	56.6
228	56.9
229	57.0
230	56.9
231	56.6
232	56.6
233	56.8
234	57.1
235	57.5
236	57.7
237	58.1
238	58.3
239	58.6
240	58.7
241	58.7
242	58.5
243	58.5
244	58.5
245	58.5
246	58.5
247	58.5
248	58.4
249	58.1
250	57.8
251	57.1
252	56.6
253	56.2
254	55.9
255	55.6
256	55.5
257	55.8
258	55.9
259	56.0
260	56.0
261	55.7
262	55.3
263	54.9
264	54.5
265	54.0
266	54.3
267	53.9
268	53.8
269	53.6
270	53.4
271	53.5
272	53.7
273	54.0

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
274	54.4
275	54.9
276	55.4
277	55.9
278	56.5
279	57.4
280	57.6
281	58.0
282	58.0
283	57.8
284	57.2
285	56.5
286	55.5
287	54.4
288	53.4
289	53.4
290	53.4
291	52.9
292	51.9
293	51.8
294	51.9
295	51.8
296	51.4
297	51.3
298	51.3
299	51.3
300	50.9
301	50.3
302	49.8
303	48.9
304	47.8
305	46.6
306	45.4
307	44.1
308	43.0
309	41.8
310	39.9
311	38.3
312	36.5
313	35.0
314	33.7
315	32.6
316	31.7
317	31.6
318	31.1
319	30.0
320	28.5
321	25.7
322	22.3
323	20.8
324	19.8
325	19.2
326	17.6
327	16.1
328	12.9
329	11.2
330	8.3
331	4.9
332	1.5
333	0
334	0
335	0
336	0
337	0
338	0
339	0
340	0
341	0
342	0

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SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
343	0
344	0
345	0
346	0
347	1.6
348	6.9
349	12.2
350	17.5
351	22.9
352	27.8
353	32.2
354	36.2
355	38.1
356	40.6
357	42.8
358	45.2
359	48.3
360	49.6
361	50.9
362	51.7
363	52.8
364	54.1
365	55.5
366	55.7
367	56.2
368	56.0
369	55.5
370	55.8
371	57.1
372	57.9
373	57.9
374	57.9
375	57.9
376	57.9
377	57.9
378	58.1
379	58.6
380	58.7
381	58.6
382	57.9
383	56.5
384	54.9
385	53.9
386	50.5
387	46.7
388	41.4
389	37.0
390	32.7
391	26.2
392	23.3
393	19.3
394	14.0
395	8.7
396	3.4
397	0
398	0
399	0
400	0
401	0
402	0
403	4.2
404	9.5
405	14.8
406	20.1
407	25.4
408	30.7
409	36.0
410	40.2
411	41.2

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
412	44.3
413	46.7
414	48.3
415	48.4
416	48.3
417	47.8
418	47.2
419	46.3
420	45.1
421	40.2
422	34.9
423	29.6
424	24.3
425	19.0
426	13.7
427	8.4
428	3.1
429	0
430	0
431	0
432	0
433	0
434	0
435	0
436	0
437	0
438	0
439	0
440	0
441	0
442	0
443	0
444	0
445	0
446	0
447	0
448	5.3
449	10.6
450	15.9
451	21.2
452	26.6
453	31.9
454	37.2
455	42.5
456	44.7
457	46.8
458	50.7
459	53.1
460	54.1
461	56.0
462	56.5
463	57.3
464	58.1
465	57.9
466	58.1
467	58.3
468	57.9
469	57.5
470	57.9
471	57.9
472	57.3
473	57.1
474	57.0
475	56.6
476	56.6
477	56.6
478	56.6
479	56.6
480	56.6

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SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
481	56.3
482	56.5
483	56.6
484	57.1
485	56.6
486	56.3
487	56.3
488	56.3
489	56.0
490	55.7
491	55.5
492	53.9
493	51.5
494	48.4
495	45.1
496	41.0
497	36.2
498	31.9
499	26.6
500	21.2
501	16.6
502	11.6
503	6.4
504	1.6
505	0
506	0
507	0
508	0
509	0
510	0
511	1.9
512	5.6
513	8.9
514	10.5
515	13.7
516	15.4
517	16.9
518	19.2
519	22.5
520	25.7
521	28.5
522	30.6
523	32.3
524	33.8
525	35.4
526	37.0
527	38.3
528	39.4
529	40.1
530	40.2
531	40.2
532	40.2
533	40.2
534	40.2
535	40.2
536	41.2
537	41.5
538	41.8
539	41.2
540	40.6
541	40.2
542	40.2
543	40.2
544	39.3
545	37.2
546	31.9
547	26.6
548	21.2
549	15.9

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
550	10.6
551	5.2
552	0
553	0
554	0
555	0
556	0
557	0
558	0
559	0
560	0
561	0
562	0
563	0
564	0
565	0
566	0
567	0
568	0
569	5.3
570	10.6
571	15.9
572	20.9
573	23.5
574	25.7
575	27.4
576	27.4
577	27.4
578	28.2
579	28.5
580	28.5
581	28.2
582	27.4
583	27.2
584	26.7
585	27.4
586	27.5
587	27.4
588	26.7
589	26.6
590	26.6
591	26.7
592	27.4
593	28.3
594	29.8
595	30.9
596	32.5
597	33.8
598	34.0
599	34.1
600	34.8
601	35.4
602	36.0
603	36.2
604	36.2
605	36.2
606	36.5
607	38.1
608	40.4
609	41.8
610	42.6
611	43.5
612	42.0
613	36.7
614	31.4
615	26.1
616	20.8
617	15.4
618	10.1

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SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
619	4.8
620	0
621	0
622	0
623	0
624	0
625	0
626	0
627	0
628	0
629	0
630	0
631	0
632	0
633	0
634	0
635	0
636	0
637	0
638	0
639	0
640	0
641	0
642	0
643	0
644	0
645	0
646	3.2
647	7.2
648	12.6
649	16.4
650	20.1
651	22.5
652	24.6
653	28.2
654	31.5
655	33.8
656	35.7
657	37.5
658	39.4
659	40.7
660	41.2
661	41.8
662	42.0
663	42.2
664	42.2
665	42.5
666	42.6
667	42.6
668	41.8
669	41.0
670	38.0
671	34.4
672	29.8
673	26.4
674	23.3
675	18.7
676	14.0
677	9.3
678	5.6
679	3.2
680	0
681	0
682	0
683	0
684	0
685	0
686	0
687	0

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
688	0
689	0
690	0
691	0
692	0
693	0
694	2.3
695	5.3
696	7.1
697	10.5
698	14.8
699	18.2
700	21.7
701	23.5
702	26.4
703	26.9
704	26.6
705	26.6
706	29.3
707	30.9
708	32.3
709	34.6
710	36.2
711	36.2
712	35.6
713	36.5
714	37.5
715	37.8
716	36.2
717	34.8
718	33.0
719	29.0
720	24.1
721	19.3
722	14.5
723	10.0
724	7.2
725	4.8
726	3.4
727	0.8
728	0.8
729	5.1
730	10.5
731	15.4
732	20.1
733	22.5
734	25.7
735	29.0
736	31.5
737	34.6
738	37.2
739	39.4
740	41.0
741	42.6
742	43.6
743	44.4
744	44.9
745	45.5
746	46.0
747	46.0
748	45.5
749	45.4
750	45.1
751	44.3
752	43.1
753	41.0
754	37.8
755	34.6
756	30.6

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SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
757	26.6
758	24.0
759	20.1
760	15.1
761	10.0
762	4.8
763	2.4
764	2.4
765	0.8
766	0
767	4.8
768	10.1
769	15.4
770	20.8
771	25.4
772	28.2
773	29.6
774	31.4
775	33.3
776	35.4
777	37.3
778	40.2
779	42.6
780	44.3
781	45.1
782	45.5
783	46.5
784	46.5
785	46.5
786	46.3
787	45.9
788	45.5
789	45.5
790	45.5
791	45.4
792	44.4
793	44.3
794	44.3
795	44.3
796	44.3
797	44.3
798	44.3
799	44.3
800	44.4
801	45.1
802	45.9
803	48.3
804	49.9
805	51.5
806	53.1
807	53.1
808	54.1
809	54.7
810	55.2
811	55.0
812	54.7
813	54.7
814	54.6
815	54.1
816	53.3
817	53.1
818	52.3
819	51.5
820	51.3
821	50.9
822	50.7
823	49.2
824	48.3
825	48.1

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
826	48.1
827	48.1
828	47.6
829	47.5
830	47.5
831	47.2
832	46.5
833	45.4
834	44.6
835	43.5
836	41.0
837	38.1
838	35.4
839	33.0
840	30.9
841	30.9
842	32.3
843	33.6
844	34.4
845	35.4
846	36.4
847	37.3
848	38.6
849	40.2
850	41.8
851	42.8
852	42.8
853	43.1
854	43.5
855	43.8
856	44.7
857	45.2
858	46.3
859	46.5
860	46.7
861	46.8
862	46.7
863	45.2
864	44.3
865	43.5
866	41.5
867	40.2
868	39.4
869	39.9
870	40.4
871	41.0
872	41.4
873	42.2
874	43.3
875	44.3
876	44.7
877	45.7
878	46.7
879	47.0
880	46.8
881	46.7
882	46.5
883	45.9
884	45.2
885	45.1
886	45.1
887	44.4
888	43.8
889	42.8
890	43.5
891	44.3
892	44.7
893	45.1
894	44.7

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SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
895	45.1
896	45.1
897	45.1
898	44.6
899	44.1
900	43.3
901	42.8
902	42.6
903	42.6
904	42.6
905	42.3
906	42.2
907	42.2
908	41.7
909	41.2
910	41.2
911	41.7
912	41.5
913	41.0
914	39.6
915	37.8
916	35.7
917	34.8
918	34.8
919	34.9
920	36.4
921	37.7
922	38.6
923	38.9
924	39.3
925	40.1
926	40.4
927	40.6
928	40.7
929	41.0
930	40.6
931	40.2
932	40.2
933	40.2
934	39.8
935	39.4
936	39.1
937	39.1
938	39.4
939	40.2
940	40.2
941	39.6
942	39.6
943	38.8
944	39.4
945	40.4
946	41.2
947	40.4
948	38.6
949	35.4
950	32.3
951	27.2
952	21.9
953	16.6
954	11.3
955	6.0
956	0.6
957	0
958	0
959	0
960	3.2
961	8.5
962	13.8
963	19.2

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
964	24.5
965	28.2
966	29.9
967	32.2
968	34.0
969	35.4
970	37.0
971	39.4
972	42.3
973	44.3
974	45.2
975	45.7
976	45.9
977	45.9
978	45.9
979	44.6
980	44.3
981	43.8
982	43.1
983	42.6
984	41.8
985	41.4
986	40.6
987	38.6
988	35.4
989	34.6
990	34.6
991	35.1
992	36.2
993	37.0
994	36.7
995	36.7
996	37.0
997	36.5
998	36.5
999	36.5
1,000	37.8
1,001	38.6
1,002	39.6
1,003	39.9
1,004	40.4
1,005	41.0
1,006	41.2
1,007	41.0
1,008	40.2
1,009	38.8
1,010	38.1
1,011	37.3
1,012	36.9
1,013	36.2
1,014	35.4
1,015	34.8
1,016	33.0
1,017	28.2
1,018	22.9
1,019	17.5
1,020	12.2
1,021	6.9
1,022	1.6
1,023	0
1,024	0
1,025	0
1,026	0
1,027	0
1,028	0
1,029	0
1,030	0
1,031	0
1,032	0

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SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
1,033	0
1,034	0
1,035	0
1,036	0
1,037	0
1,038	0
1,039	0
1,040	0
1,041	0
1,042	0
1,043	0
1,044	0
1,045	0
1,046	0
1,047	0
1,048	0
1,049	0
1,050	0
1,051	0
1,052	0
1,053	1.9
1,054	6.4
1,055	11.7
1,056	17.1
1,057	22.4
1,058	27.4
1,059	29.8
1,060	32.2
1,061	35.1
1,062	37.0
1,063	38.6
1,064	39.9
1,065	41.2
1,066	42.6
1,067	43.1
1,068	44.1
1,069	44.9
1,070	45.5
1,071	45.1
1,072	44.3
1,073	43.5
1,074	43.5
1,075	42.3
1,076	39.4
1,077	36.2
1,078	34.6
1,079	33.2
1,080	29.0
1,081	24.1
1,082	19.8
1,083	17.9
1,084	17.1
1,085	16.1
1,086	15.3
1,087	14.6
1,088	14.0
1,089	13.8
1,090	14.2
1,091	14.5
1,092	14.0
1,093	13.8
1,094	12.9
1,095	11.3
1,096	8.0
1,097	6.8
1,098	4.2
1,099	1.6
1,100	0.9
1,101	0.2

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
1,102	1.0
1,103	2.6
1,104	5.8
1,105	11.1
1,106	16.1
1,107	20.6
1,108	22.5
1,109	23.3
1,110	25.7
1,111	29.1
1,112	32.2
1,113	33.8
1,114	34.1
1,115	34.3
1,116	34.4
1,117	34.9
1,118	36.2
1,119	37.0
1,120	38.3
1,121	39.4
1,122	40.2
1,123	40.1
1,124	39.9
1,125	40.2
1,126	40.9
1,127	41.5
1,128	41.8
1,129	42.5
1,130	42.8
1,131	43.3
1,132	43.5
1,133	43.5
1,134	43.5
1,135	43.3
1,136	43.1
1,137	43.1
1,138	42.6
1,139	42.5
1,140	41.8
1,141	41.0
1,142	39.6
1,143	37.8
1,144	34.6
1,145	32.2
1,146	28.2
1,147	25.7
1,148	22.5
1,149	17.2
1,150	11.9
1,151	6.6
1,152	1.3
1,153	0
1,154	0
1,155	0
1,156	0
1,157	0
1,158	0
1,159	0
1,160	0
1,161	0
1,162	0
1,163	0
1,164	0
1,165	0
1,166	0
1,167	0
1,168	0
1,169	3.4
1,170	8.7

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SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
1,171	14.0
1,172	19.3
1,173	24.6
1,174	29.9
1,175	34.0
1,176	37.0
1,177	37.8
1,178	37.0
1,179	36.2
1,180	32.2
1,181	26.9
1,182	21.6
1,183	16.3
1,184	10.9
1,185	5.6
1,186	0.3
1,187	0
1,188	0
1,189	0
1,190	0
1,191	0
1,192	0
1,193	0.0
1,194	0.0
1,195	0.0
1,196	0.0
1,197	0.3
1,198	2.4
1,199	5.6
1,200	10.5
1,201	15.8
1,202	19.3
1,203	20.8
1,204	20.9
1,205	20.3
1,206	20.6
1,207	21.1
1,208	21.1
1,209	22.5
1,210	24.9
1,211	27.4
1,212	29.9
1,213	31.7
1,214	33.8
1,215	34.6
1,216	35.1
1,217	35.1
1,218	34.6
1,219	34.1
1,220	34.6
1,221	35.1
1,222	35.4
1,223	35.2
1,224	34.9
1,225	34.6
1,226	34.6
1,227	34.4
1,228	32.3
1,229	31.4
1,230	30.9
1,231	31.5
1,232	31.9
1,233	32.2
1,234	31.4
1,235	28.2
1,236	24.9
1,237	20.9
1,238	16.1
1,239	12.9

SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
1,240	9.7
1,241	6.4
1,242	4.0
1,243	1.1
1,244	0
1,245	0
1,246	0
1,247	0
1,248	0
1,249	0
1,250	0
1,251	0
1,252	1.6
1,253	1.6
1,254	1.6
1,255	1.6
1,256	1.6
1,257	2.6
1,258	4.8
1,259	6.4
1,260	8.0
1,261	10.1
1,262	12.9
1,263	16.1
1,264	16.9
1,265	15.3
1,266	13.7
1,267	12.2
1,268	14.2
1,269	17.7
1,270	22.5
1,271	27.4
1,272	31.4
1,273	33.8
1,274	35.1
1,275	35.7
1,276	37.0
1,277	38.0
1,278	38.8
1,279	39.4
1,280	39.4
1,281	38.6
1,282	37.8
1,283	37.8
1,284	37.8
1,285	37.8
1,286	37.8
1,287	37.8
1,288	38.6
1,289	38.8
1,290	39.4
1,291	39.8
1,292	40.2
1,293	40.9
1,294	41.2
1,295	41.4
1,296	41.8
1,297	42.2
1,298	43.5
1,299	44.7
1,300	45.5
1,301	46.7
1,302	46.8
1,303	46.7
1,304	45.1
1,305	39.8
1,306	34.4
1,307	29.1
1,308	23.8

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SPEED VERSUS TIME SEQUENCE—Continued

Time (seconds)	Speed (kilometers per hour)
1,309	18.5
1,310	13.2
1,311	7.9
1,312	2.6
1,313	0
1,314	0
1,315	0
1,316	0
1,317	0
1,318	0
1,319	0
1,320	0
1,321	0
1,322	0
1,323	0
1,324	0
1,325	0
1,326	0
1,327	0
1,328	0
1,329	0
1,330	0
1,331	0
1,332	0
1,333	0
1,334	0
1,335	0
1,336	0
1,337	0
1,338	2.4
1,339	7.7
1,340	13.0
1,341	16.3
1,342	21.2
1,343	24.3
1,344	27.0
1,345	29.5
1,346	31.4
1,347	32.7
1,348	34.3
1,349	35.2
1,350	35.6
1,351	36.0
1,352	35.4
1,353	34.8
1,354	34.0
1,355	33.0
1,356	32.2
1,357	31.8
1,358	29.8
1,359	28.2
1,360	26.6
1,361	24.9
1,362	22.5
1,363	17.7
1,364	12.9
1,365	8.4
1,366	4.0
1,367	0
1,368	0
1,369	0
1,370	0
1,371	0

(d)—(e) [Reserved]

(f)(1) EPA Engine Dynamometer Schedule for Heavy-Duty Gasoline Engines.

PERCENT REVOLUTIONS PER MINUTE AND TORQUE VERSUS TIME SEQUENCE

Record (sec)	Revolutions per minute	Torque
0	0.0	0.0
1	0.0	0.0
2	0.0	0.0
3	0.0	0.0
4	0.0	0.0
5	0.0	0.0
6	0.0	0.0
7	0.0	0.0
8	0.0	0.0
9	0.0	0.0
10	0.0	0.0
11	0.0	0.0
12	0.0	0.0
13	0.0	0.0
14	0.0	0.0
15	0.0	0.0
16	0.0	0.0
17	0.0	0.0
18	0.0	0.0
19	0.0	0.0
20	0.0	0.0
21	0.0	0.0
22	0.0	0.0
23	0.0	0.0
24	0.0	0.0
25	−1.78	44.40
26	0.0	85.35
27	4.25	100.00
28	27.47	100.00
29	42.96	100.00
30	45.79	100.00
31	48.11	99.46
32	50.42	90.00
33	52.74	75.23
34	54.00	50.00
35	44.42	8.96
36	45.05	−10.00
37	46.00	9.99
38	37.69	−10.00
39	31.61	5.68
40	22.94	35.29
41	24.00	4.87
42	20.86	−10.00
43	12.45	−10.00
44	6.00	−10.00
45	6.52	−10.00
46	7.17	−10.00
47	2.56	−10.00
48	0.0	0.0
49	0.0	0.0
50	0.0	0.0
51	0.0	10.11
52	4.32	46.40
53	8.90	45.17
54	1.95	50.00
55	3.33	41.68
56	4.00	89.46
57	13.76	55.60
58	26.43	26.96
59	33.85	−6.16
60	36.00	−10.00
61	34.45	−10.00
62	34.00	−10.00
63	35.64	−10.00
64	32.99	27.39
65	36.00	80.00
66	41.63	74.37

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PERCENT REVOLUTIONS PER MINUTE AND TORQUE VERSUS TIME SEQUENCE—Continued

Record (sec)	Revolutions per minute	Torque
57	60.41	26.76
68	48.44	−10.00
69	43.86	−10.00
70	40.39	−10.00
71	38.50	4.01
72	35.05	30.00
73	40.66	16.70
74	43.64	26.45
75	45.96	−10.00
76	47.10	−10.00
77	49.29	−10.00
78	37.10	−10.00
79	36.00	−10.00
80	34.47	−10.00
81	32.15	−10.00
82	31.67	−10.00
83	28.48	13.89
84	32.38	90.00
85	36.00	90.00
86	41.69	90.00
87	45.74	90.00
88	49.95	80.00
89	49.10	80.00
90	50.59	62.97
91	45.99	34.98
92	42.76	7.23
93	35.12	−10.00
94	32.06	67.92
95	35.53	62.55
96	46.57	68.60
97	49.77	48.85
98	52.00	60.00
99	58.06	60.00
100	63.66	23.42
101	64.14	17.84
102	59.58	3.76
103	38.00	42.26
104	39.09	30.00
105	40.00	30.00
106	34.85	47.18
107	32.03	10.33
108	34.00	33.48
109	34.00	50.00
110	33.02	20.69
111	25.54	−10.00
112	15.57	−10.00
113	14.00	−10.00
114	14.47	27.64
115	18.00	4.49
116	17.13	−10.00
117	16.00	−10.00
118	10.02	−10.00
119	9.81	−10.00
120	5.88	−10.00
121	4.00	−10.00
122	4.00	−10.00
123	2.93	−10.00
124	0.02	−10.00
125	0.0	0.0
126	0.0	0.0
127	0.0	0.0
128	0.0	0.0
129	0.0	0.0
130	0.0	10.00
131	0.0	10.00
132	0.0	29.02
133	0.0	27.83

PERCENT REVOLUTIONS PER MINUTE AND TORQUE VERSUS TIME SEQUENCE—Continued

Record (sec)	Revolutions per minute	Torque
134	0.0	7.34
135	0.0	0.0
136	0.0	0.0
137	0.0	0.0
138	0.0	0.0
139	0.0	0.0
140	0.0	0.0
141	0.0	0.0
142	0.0	0.0
143	0.0	0.0
144	0.0	0.0
145	0.0	0.0
146	2.00	0.0
147	1.38	0.0
148	0.0	0.0
149	0.0	6.27
150	0.0	2.16
151	0.0	0.0
152	0.0	0.0
153	0.0	0.0
154	0.83	−10.00
155	2.00	−10.00
156	0.54	−10.00
157	0.0	0.0
158	0.0	0.0
159	0.0	0.0
160	0.0	0.0
161	0	0.0
162	0	0.0
163	0	0.0
164	0.0	0.0
165	0.0	0.0
166	0.0	0.0
167	0.0	22.01
168	1.23	72.29
169	6.63	80.00
170	17.29	89.29
171	22.17	90.00
172	24.00	82.70
173	24.00	31.96
174	24.00	−10.00
175	22.57	−10.00
176	22.00	−10.00
177	13.88	−10.00
178	10.00	−10.00
179	9.31	−10.00
180	3.99	−10.00
181	0.0	0.0
182	0.0	0.0
183	0.0	0.0
184	0.0	0.0
185	0.0	0.0
186	0.0	0.0
187	0.0	0.0
188	0.0	0.0
189	0.0	0.0
190	0.0	0.0
191	0.0	0.0
192	0.0	0.0
193	0.0	0.0
194	0.0	0.0
195	0.0	0.0
196	0.0	0.0
197	0.0	0.0
198	0.0	0.0
199	0.0	0.0
200	0.0	0.0

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PERCENT REVOLUTIONS PER MINUTE AND TORQUE VERSUS TIME SEQUENCE—Continued

Record (sec)	Revolutions per minute	Torque
201	0.0	0.0
202	0.0	0.0
203	0.0	0.0
204	-2.52	6.30
205	-4.22	15.28
206	0.0	10.00
207	0.0	10.00
208	0.0	10.00
209	0.0	75.93
210	0.0	32.22
211	1.67	35.00
212	15.48	29.82
213	25.46	-10.00
214	24.22	-10.00
215	23.44	-10.00
216	12.41	80.00
217	8.94	83.61
218	7.26	84.82
219	16.70	80.00
220	24.67	63.33
221	0.24	79.81
222	0.0	8.52
223	0.0	0.0
224	0.0	0.0
225	0.0	0.0
226	0.0	0.0
227	0.0	0.0
228	0.0	0.0
229	0.0	0.0
230	0.0	0.0
231	0.0	0.0
232	0.0	0.0
233	0.0	17.59
234	0.0	19.63
235	0.0	10.00
236	0.0	10.00
237	0.0	10.00
238	0.0	3.34
239	0.0	0.0
240	0.0	0.0
241	0.0	0.0
242	0.0	0.0
243	0.0	0.0
244	0.0	0.0
245	0.0	0.0
246	0.0	0.0
247	0.0	0.0
248	0.0	0.0
249	0.0	0.0
250	0.0	0.0
251	0.0	0.0
252	0.0	0.0
253	0.0	0.0
254	0.0	0.0
255	0.0	0.0
256	0.0	0.0
257	0.0	0.0
258	0.0	0.0
259	0.0	0.0
260	0.0	0.0
261	0.0	0.0
262	0.0	0.0
263	0.0	0.0
264	0.0	0.0
265	0.0	0.0
266	0.0	0.0
267	0.0	0.0

PERCENT REVOLUTIONS PER MINUTE AND TORQUE VERSUS TIME SEQUENCE—Continued

Record (sec)	Revolutions per minute	Torque
268	0.0	0.0
269	0.0	0.0
270	0.0	0.0
271	0.0	0.0
272	0.0	0.0
273	0.0	0.0
274	0.0	0.0
275	0.0	0.0
276	0.0	0.0
277	0.0	0.0
278	0.0	0.0
279	0.0	0.0
280	0.0	0.0
281	0.0	4.17
282	1.15	10.00
283	2.00	10.00
284	0.22	10.00
285	0.0	0.0
286	0.0	0.0
287	0.0	0.0
288	0.0	0.0
289	0.0	0.0
290	0.0	0.0
291	0.0	0.0
292	0.0	0.0
293	0.0	0.0
294	0.0	0.0
295	0.0	0.0
296	0.0	0.0
297	0.0	0.0
298	0.0	0.0
299	0.0	0.0
300	0.0	4.07
301	0.0	10.00
302	0.0	17.22
303	0.0	20.00
304	0.0	20.37
305	2.33	31.94
306	16.22	36.48
307	24.00	24.91
308	24.00	13.34
309	19.06	10.00
310	18.00	-10.00
311	17.17	-10.00
312	9.04	-10.00
313	1.09	-10.00
314	0.0	0.0
315	0.0	0.0
316	0.0	0.0
317	0.0	0.0
318	0.0	0.0
319	0.0	0.0
320	0.0	0.0
321	0.0	0.0
322	0.0	0.0
323	0.0	0.82
324	0.37	41.08
325	2.68	90.00
326	6.00	94.99
327	11.94	100.00
328	15.63	100.00
329	41.26	90.28
330	46.26	90.00
331	44.56	67.08
332	36.00	1.12
333	27.58	50.12
334	23.52	90.00

BEST DOCUMENT AVAILABLE

PERCENT REVOLUTIONS PER MINUTE AND TORQUE VERSUS TIME SEQUENCE—Continued

Record (sec)	Revolutions per minute	Torque
335	24.00	90.00
336	26.29	70.00
337	30.00	65.38
338	30.00	34.47
339	30.00	10.00
340	30.00	10.00
341	30.00	10.00
342	30.18	60.00
343	40.00	58.25
344	40.67	50.00
345	41.02	50.00
346	40.00	50.00
347	41.61	50.00
348	42.00	50.00
349	46.00	50.00
350	48.22	50.00
351	59.21	58.69
352	67.18	70.00
353	71.00	70.00
354	72.00	70.00
355	72.13	68.08
356	74.89	28.94
357	68.91	−10.00
358	49.71	−10.00
359	41.84	−10.00
360	38.30	−10.00
361	35.93	−10.00
362	28.00	−10.00
363	23.48	−10.00
364	10.16	−10.00
365	4.72	−10.00
366	0.82	5.90
367	9.53	19.53
368	2.20	45.60
369	20.53	7.33
370	21.15	0.0
371	17.67	−10.00
372	13.04	−10.00
373	8.41	79.70
374	10.33	100.00
375	17.27	100.00
376	22.00	100.00
377	25.16	100.00
378	29.37	100.00
379	36.73	66.35
380	40.00	−10.00
381	23.50	−10.00
382	9.37	−10.00
383	8.00	−10.00
384	6.74	−10.00
385	2.86	−10.00
386	0.11	−10.00
387	0.0	0.0
388	0.0	0.0
389	0.0	0.0
390	0.0	0.0
391	0.0	0.0
392	0.0	0.0
393	0.0	0.0
394	0.0	0.0
395	0.0	0.0
396	0.0	0.0
397	0.0	0.0
398	0.0	0.0
399	0.0	0.0
400	0.0	0.0
401	0.0	0.0

PERCENT REVOLUTIONS PER MINUTE AND TORQUE VERSUS TIME SEQUENCE—Continued

Record (sec)	Revolutions per minute	Torque
402	0.0	0.0
403	0.0	0.0
404	0.0	0.0
405	0.0	0.0
406	0.0	0.0
407	0.0	0.0
408	0.0	0.0
409	0.0	0.0
410	0.0	0.0
411	0.0	0.0
412	0.0	0.0
413	0.0	0.0
414	0.0	0.0
415	0.0	0.0
416	0.0	0.0
417	0.0	0.0
418	0.0	0.0
419	2.27	20.00
420	2.82	14.11
421	0.0	0.0
422	0.0	0.0
423	0.0	0.0
424	0.0	0.0
425	0.0	0.0
426	0.0	0.0
427	0.0	0.0
428	0.0	0.0
429	0.0	0.0
430	0.0	0.0
431	0.26	0.78
432	16.60	31.83
433	45.32	29.78
434	43.00	10.00
435	40.69	10.00
436	35.12	10.00
437	28.18	19.70
438	28.26	47.45
439	30.00	30.00
440	30.00	30.00
441	30.00	30.00
442	34.54	30.00
443	36.00	30.00
444	36.43	30.00
445	43.84	30.00
446	50.00	30.00
447	50.00	−24.56
448	50.00	20.00
449	50.00	−10.00
450	37.97	−10.00
451	35.30	−10.00
452	30.68	−10.00
453	27.02	−10.00
454	26.00	−10.00
455	26.00	−10.00
456	20.24	−10.00
457	14.00	−10.00
458	13.45	18.27
459	9.40	52.99
460	10.72	81.81
461	15.50	97.48
462	19.62	100.00
463	20.25	100.00
464	25.76	100.00
465	35.02	100.00
466	42.14	94.65
467	44.00	90.00
468	45.70	90.00

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PERCENT REVOLUTIONS PER MINUTE AND TORQUE VERSUS TIME SEQUENCE—Continued

Record (sec)	Revolutions per minute	Torque
469	51.99	60.00
470	50.00	60.00
471	51.29	63.22
472	54.96	70.00
473	56.00	70.00
474	62.35	38.25
475	71.61	30.00
476	76.22	50.00
477	78.00	50.00
478	78.00	41.53
479	55.93	12.58
480	38.52	0.0
481	34.42	71.65
482	36.11	79.47
483	38.84	67.90
484	42.74	60.00
485	44.00	54.75
486	49.46	36.35
487	52.00	30.00
488	32.05	−10.00
489	25.69	0.0
490	24.00	0.0
491	24.00	−10.00
492	20.24	−10.00
493	10.16	68.43
494	8.00	80.58
495	10.20	80.99
496	13.54	90.00
497	18.00	94.13
498	20.28	100.00
499	22.00	100.00
500	23.77	91.15
501	28.08	90.00
502	30.00	86.01
503	32.85	80.70
504	32.86	100.00
505	33.37	100.00
506	36.00	100.00
507	51.77	100.00
508	60.57	95.72
509	64.00	70.00
510	64.91	70.00
511	75.83	70.00
512	82.00	70.00
513	85.72	51.42
514	86.17	49.14
515	88.49	35.13
516	90.00	15.99
517	91.12	26.74
518	92.00	32.85
519	93.74	30.00
520	89.29	10.00
521	66.00	41.87
522	67.38	56.88
523	80.02	54.96
524	93.95	66.34
525	97.63	63.69
526	94.11	60.00
527	85.66	10.00
528	70.00	10.00
529	69.11	10.00
530	66.80	10.00
531	64.48	10.00
532	53.00	44.98
533	52.73	49.27
534	62.00	40.00
535	62.00	43.88

PERCENT REVOLUTIONS PER MINUTE AND TORQUE VERSUS TIME SEQUENCE—Continued

Record (sec)	Revolutions per minute	Torque
536	64.18	44.55
537	53.36	4.88
538	46.28	15.79
539	46.00	19.83
540	45.65	10.00
541	45.99	10.00
542	48.05	10.00
543	44.71	3.54
544	48.82	−10.00
545	51.92	66.82
546	47.53	−10.00
547	36.31	9.23
548	17.73	55.68
549	29.43	38.22
550	36.00	37.46
551	36.00	40.00
552	34.00	40.00
553	34.00	40.00
554	34.00	36.25
555	38.26	24.68
556	43.38	61.38
557	50.78	46.12
558	52.00	19.92
559	52.32	0.0
560	52.09	3.19
561	48.00	10.00
562	48.00	10.00
563	48.00	10.00
564	30.94	19.48
565	28.00	20.00
566	28.00	20.00
567	28.00	15.81
568	28.00	10.00
569	26.53	10.00
570	26.00	10.00
571	23.71	−10.00
572	17.59	−10.00
573	11.65	−10.00
574	1.92	−10.00
575	0.0	0.0
576	0.0	0.0
577	0.0	0.0
578	0.0	0.0
579	0.0	0.0
580	0.0	0.0
581	0.0	0.0
582	0.0	0.0
583	1.26	25.19
584	6.72	47.87
585	13.67	40.56
586	16.20	80.00
587	18.52	80.00
588	25.83	75.83
589	35.15	70.00
590	38.93	77.31
591	41.78	80.00
592	40.00	10.00
593	40.00	20.18
594	40.00	52.78
595	40.00	34.82
596	40.00	30.00
597	40.00	38.33
598	40.00	30.09
599	38.30	100.00
600	40.61	100.00
601	42.00	100.00
602	42.00	100.00

BEST DOCUMENT AVAILABLE

PERCENT REVOLUTIONS PER MINUTE AND TORQUE VERSUS TIME SEQUENCE—Continued

Record (sec)	Revolutions per minute	Torque
603	42.00	100.00
604	42.00	100.00
605	42.00	100.00
606	42.50	97.50
607	43.19	85.93
608	43.13	85.65
609	44.00	90.00
610	44.00	90.00
611	44.00	80.00
612	44.00	80.00
613	44.70	80.00
614	46.00	74.91
615	46.00	63.34
616	46.00	60.00
617	46.00	60.00
618	44.00	10.00
619	44.00	10.00
620	43.09	10.00
621	42.00	10.00
622	42.00	10.00
623	43.85	19.26
624	50.00	90.00
625	50.00	90.00
626	50.00	90.00
627	50.00	90.00
628	50.00	90.00
629	48.26	90.00
630	48.00	89.73
631	48.37	80.00
632	49.32	80.00
633	48.00	80.00
634	48.00	80.00
635	48.00	80.00
636	48.00	70.28
637	48.00	70.00
638	48.00	70.00
639	48.00	74.44
640	48.00	61.96
641	49.52	50.00
642	50.00	50.00
643	50.00	40.00
644	50.00	44.62
645	50.78	60.00
646	52.00	49.09
647	52.00	40.00
648	52.00	40.00
649	52.04	40.89
650	54.00	90.00
651	54.00	90.00
652	54.00	85.10
653	55.29	73.53
654	56.00	70.00
655	56.00	70.00
656	56.00	60.00
657	56.00	57.23
658	56.00	50.00
659	56.00	38.17
660	56.00	30.00
661	56.00	30.00
662	54.00	39.36
663	54.00	27.79
664	54.00	20.00
665	54.00	20.00
666	54.00	20.00
667	54.00	11.49
668	54.00	0.08
669	54.00	13.31

PERCENT REVOLUTIONS PER MINUTE AND TORQUE VERSUS TIME SEQUENCE—Continued

Record (sec)	Revolutions per minute	Torque
670	54.00	30.00
671	54.96	30.00
672	57.28	30.00
673	56.41	30.00
674	57.91	30.00
675	58.22	36.60
676	60.00	90.00
677	60.00	90.00
678	60.00	95.82
679	60.00	92.60
680	60.00	90.00
681	60.00	90.00
682	60.42	90.00
683	62.74	90.00
684	65.05	90.00
685	66.00	83.16
686	66.00	71.59
687	66.00	70.00
688	66.00	70.00
689	66.00	73.14
690	66.00	80.00
691	66.00	86.28
692	66.00	90.00
693	66.00	90.00
694	68.20	100.00
695	70.00	100.00
696	70.00	100.00
697	70.00	100.00
698	74.38	100.00
699	76.00	100.00
700	72.09	100.00
701	73.60	100.00
702	72.00	100.00
703	72.00	100.00
704	72.00	100.00
705	72.00	100.00
706	72.00	100.00
707	72.29	100.00
708	73.39	100.00
709	72.92	100.00
710	74.00	100.00
711	74.00	100.00
712	77.73	100.00
713	78.00	100.00
714	77.50	100.00
715	76.00	100.00
716	76.00	100.00
717	76.00	100.00
718	72.49	100.00
719	71.79	100.00
720	67.16	100.00
721	72.70	100.00
722	75.02	100.00
723	73.34	100.00
724	73.64	91.78
725	74.00	31.21
726	78.27	28.63
727	80.00	17.05
728	80.00	5.48
729	80.00	-10.00
730	80.00	-10.00
731	80.00	63.93
732	84.00	80.00
733	85.43	82.39
734	87.62	93.96
735	84.00	100.00
736	84.00	100.00

BEST DOCUMENT AVAILABLE

PERCENT REVOLUTIONS PER MINUTE AND TORQUE VERSUS TIME SEQUENCE—Continued

Record (sec)	Revolutions per minute	Torque
737	84.00	91.32
738	86.00	100.00
739	86.73	100.00
740	90.00	96.59
741	91.99	90.00
742	94.00	90.00
743	95.63	81.87
744	96.00	89.70
745	100.00	98.72
746	100.57	78.60
747	102.88	50.00
748	104.00	73.99
749	104.00	90.00
750	104.00	25.98
751	103.71	20.00
752	99.54	20.00
753	98.00	20.00
754	99.09	25.44
755	98.60	65.08
756	103.15	80.00
757	100.03	80.00
758	102.35	80.00
759	104.00	73.38
760	104.00	55.11
761	101.42	30.62
762	98.39	11.97
763	57.65	−10.00
764	58.00	−10.00
765	57.45	−10.00
766	56.00	−10.00
767	56.00	−10.00
768	56.00	27.39
769	56.00	40.00
770	56.00	50.00
771	56.00	45.60
772	56.00	33.77
773	56.00	40.00
774	60.15	5.40
775	62.00	−10.00
776	62.00	−10.00
777	62.00	41.64
778	62.00	59.65
779	62.00	75.21
780	62.00	76.36
781	62.00	80.00
782	62.00	80.00
783	62.00	80.00
784	62.00	80.00
785	61.15	80.00
786	60.00	80.00
787	60.00	87.38
788	60.00	90.00
789	60.00	90.00
790	60.00	90.00
791	60.00	90.00
792	60.00	90.00
793	60.00	83.17
794	60.00	80.00
795	60.00	89.97
796	62.31	90.00
797	64.00	86.88
798	64.00	80.00
799	64.00	80.00
800	64.00	80.00
801	64.00	80.00
802	66.00	70.00
803	66.51	70.00

PERCENT REVOLUTIONS PER MINUTE AND TORQUE VERSUS TIME SEQUENCE—Continued

Record (sec)	Revolutions per minute	Torque
804	68.00	65.87
805	68.00	60.00
806	68.00	60.00
807	73.31	86.55
808	74.00	90.00
809	74.00	90.00
810	73.29	90.00
811	72.00	84.86
812	73.34	73.29
813	74.00	70.00
814	72.03	70.00
815	71.71	50.00
816	70.00	50.00
817	70.00	50.00
818	68.77	56.15
819	68.00	60.00
820	68.00	60.00
821	68.00	58.28
822	68.00	40.00
823	68.00	48.01
824	68.00	60.00
825	68.00	60.00
826	68.00	60.00
827	68.00	60.00
828	68.00	61.87
829	68.00	70.00
830	69.00	70.00
831	70.00	70.00
832	70.00	70.00
833	70.00	70.00
834	70.00	70.00
835	70.00	70.00
836	70.00	70.00
837	73.61	70.00
838	76.00	62.41
839	76.00	60.00
840	76.00	100.00
841	76.92	100.00
842	80.78	100.00
843	82.00	100.00
844	83.40	100.00
845	84.00	100.00
846	83.97	90.00
847	82.35	90.00
848	85.33	93.31
849	89.95	100.00
850	88.13	100.00
851	89.21	100.00
852	95.76	100.00
853	100.23	100.00
854	102.00	100.00
855	104.59	100.00
856	112.71	100.00
857	113.01	100.00
858	112.00	100.00
859	104.00	−10.00
860	103.56	−10.00
861	102.75	−10.00
862	102.94	−10.00
863	99.24	−10.00
864	94.61	−10.00
865	93.99	−10.00
866	92.32	−10.00
867	93.36	−10.00
868	92.00	−10.00
869	90.73	−10.00
870	88.42	−10.00

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PERCENT REVOLUTIONS PER MINUTE AND TORQUE VERSUS TIME SEQUENCE—Continued

Record (sec)	Revolutions per minute	Torque
871	84.21	10.00
872	52.00	10.00
873	82.00	7.38
874	82.00	10.00
875	82.00	10.00
876	68.79	48.69
877	64.00	70.00
878	64.00	70.00
879	58.66	67.95
880	37.27	60.00
881	34.96	60.00
882	32.65	73.54
883	30.33	80.00
884	28.02	80.00
885	25.70	50.00
886	23.39	37.76
887	21.07	10.00
888	18.76	10.00
889	14.89	-10.00
890	12.13	-10.00
891	5.45	-10.00
892	0.0	0.0
893	0.0	0.0
894	0.0	0.0
895	0.0	0.0
896	0.0	0.0
897	0.0	0.0
898	0.0	0.0
899	0.0	0.0
900	0.0	0.0
901	0.0	0.0
902	0.0	0.0
903	0.0	0.0
904	0.0	0.0
905	0.0	0.0
906	0.0	0.0
907	0.0	0.0
908	0.0	0.0
909	0.0	0.0
910	0.0	0.0
911	0.0	0.0
912	0.0	0.0
913	0.0	0.0
914	0.0	0.0
915	0.0	0.0
916	0.0	0.0
917	0.0	0.0
918	0.0	0.0
919	0.0	0.0
920	1.78	44.40
921	0.0	85.35
922	4.25	100.00
923	27.47	100.00
924	42.96	100.00
925	45.79	100.00
926	48.11	99.46
927	50.42	90.00
928	52.74	75.23
929	54.00	50.00
930	44.42	8.96
931	45.05	-10.00
932	46.00	9.99
933	37.69	10.00
934	31.61	5.68
935	22.94	35.29
936	24.00	4.87
937	20.86	-10.00

PERCENT REVOLUTIONS PER MINUTE AND TORQUE VERSUS TIME SEQUENCE—Continued

Record (sec)	Revolutions per minute	Torque
938	12.45	-10.00
939	6.00	-10.00
940	6.52	-10.00
941	7.17	-10.00
942	2.56	-10.00
943	0.0	0.0
944	0.0	0.0
945	0.0	0.0
946	0.0	10.11
947	4.32	46.40
948	8.90	45.17
949	1.95	50.00
950	3.33	41.68
951	4.00	89.46
952	13.76	55.60
953	26.43	26.96
954	33.85	6.16
955	36.00	-10.00
956	34.45	-10.00
957	34.00	-10.00
958	35.64	-10.00
959	32.99	27.39
960	36.00	80.00
961	41.63	74.37
962	60.41	26.76
963	48.44	-10.00
964	43.86	-10.00
965	40.39	-10.00
966	38.50	4.01
967	35.05	30.00
968	40.66	16.70
969	43.64	26.45
970	45.96	-10.00
971	47.10	-10.00
972	49.29	-10.00
973	37.10	-10.00
974	36.00	-10.00
975	34.47	-10.00
976	32.15	-10.00
977	31.67	-10.00
978	28.48	13.89
979	32.38	90.00
980	36.00	90.00
981	41.69	90.00
982	45.74	90.00
983	49.95	80.00
984	49.10	80.00
985	50.59	62.97
986	45.99	34.98
987	42.76	7.23
988	35.12	-10.00
989	32.06	67.92
990	35.53	62.55
991	46.57	68.60
992	49.77	48.85
993	52.00	60.00
994	58.06	60.00
995	63.66	23.42
996	64.14	17.84
997	59.58	3.76
998	38.00	42.26
999	39.09	30.00
1000	40.00	30.00
1001	34.85	47.18
1002	32.03	10.33
1003	34.00	33.48
1004	34.00	50.00

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PERCENT REVOLUTIONS PER MINUTE AND TORQUE VERSUS TIME SEQUENCE—Continued

Record (sec)	Revolutions per minute	Torque
1005	33.02	20.69
1006	25.54	10.00
1007	15.57	10.00
1008	14.00	10.00
1009	14.47	27.64
1010	18.00	4.49
1011	17.13	10.00
1012	16.00	10.00
1013	0.02	10.00
1014	9.81	10.00
1015	5.88	10.00
1016	4.00	10.00
1017	4.00	10.00
1018	2.93	10.00
1019	0.62	10.00
1020	0.0	0.0
1021	0.0	0.0
1022	0.0	0.0
1023	0.0	0.0
1024	0.0	0.0
1025	0.0	10.00
1026	0.0	10.00
1027	0.0	29.02
1028	0.0	27.83
1029	0.0	7.34
1030	0.0	0.0
1031	0.0	0.0
1032	0.0	0.0
1033	0.0	0.0
1034	0.0	0.0
1035	0.0	0.0
1036	0.0	0.0
1037	0.0	0.0
1038	0.0	0.0
1039	0.0	0.0
1040	0.0	0.0
1041	2.00	0.0
1042	1.38	0.0
1043	0.0	0.0
1044	0.0	6.27
1045	0.0	2.16
1046	0.0	0.0
1047	0.0	0.0
1048	0.0	0.0
1049	0.83	10.00
1050	2.00	10.00
1051	0.54	10.00
1052	0.0	0.0
1053	0.0	0.0
1054	0.0	0.0
1055	0.0	0.0
1056	0.0	0.0
1057	0.0	0.0
1058	0.0	0.0
1059	0.0	0.0
1060	0.0	0.0
1061	0.0	0.0
1062	0.0	22.01
1063	1.23	72.29
1064	6.63	80.00
1065	17.29	89.29
1066	22.17	90.00
1067	24.00	82.70
1068	24.00	31.96
1069	24.00	10.00
1070	22.57	10.00
1071	22.00	10.00

PERCENT REVOLUTIONS PER MINUTE AND TORQUE VERSUS TIME SEQUENCE—Continued

Record (sec)	Revolutions per minute	Torque
1072	13.88	−10.00
1073	10.00	−10.00
1074	9.31	−10.00
1075	3.99	−10.00
1076	0.0	0.0
1077	0.0	0.0
1078	0.0	0.0
1079	0.0	0.0
1080	0.0	0.0
1081	0.0	0.0
1082	0.0	0.0
1083	0.0	0.0
1084	0.0	0.0
1085	0.0	0.0
1086	0.0	0.0
1087	0.0	0.0
1088	0.0	0.0
1089	0.0	0.0
1090	0.0	0.0
1091	0.0	0.0
1092	0.0	0.0
1093	0.0	0.0
1094	0.0	0.0
1095	0.0	0.0
1096	0.0	0.0
1097	0.0	0.0
1098	0.0	0.0
1099	−2.52	6.30
1100	−4.22	15.28
1101	0.0	10.00
1102	0.0	10.00
1103	0.0	10.00
1104	0.0	75.93
1105	0.0	32.22
1106	1.67	35.00
1107	15.48	29.82
1108	25.46	−10.00
1109	24.22	−10.00
1110	23.44	−10.00
1111	12.41	80.00
1112	8.94	83.61
1113	7.26	84.82
1114	16.70	80.00
1115	24.67	63.33
1116	0.24	79.81
1117	0.0	8.52
1118	0.0	0.0
1119	0.0	0.0
1120	0.0	0.0
1121	0.0	0.0
1122	0.0	0.0
1123	0.0	0.0
1124	0.0	0.0
1125	0.0	0.0
1126	0.0	0.0
1127	0.0	0.0
1128	0.0	17.59
1129	0.0	19.63
1130	0.0	10.00
1131	0.0	10.00
1132	0.0	10.00
1133	0.0	3.34
1134	0.0	0.0
1135	0.0	0.0
1136	0.0	0.0
1137	0.0	0.0
1138	0.0	0.0

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PERCENT REVOLUTIONS PER MINUTE AND TORQUE VERSUS TIME SEQUENCE—Continued

Record (sec)	Revolutions per minute	Torque
1139	0.0	0.0
1140	0.0	0.0
1141	0.0	0.0
1142	0.0	0.0
1143	0.0	0.0
1144	0.0	0.0
1145	0.0	0.0
1146	0.0	0.0
1147	0.0	0.0
1148	0.0	0.0
1149	0.0	0.0
1150	0.0	0.0
1151	0.0	0.0
1152	0.0	0.0
1153	0.0	0.0
1154	0.0	0.0
1155	0.0	0.0
1156	0.0	0.0
1157	0.0	0.0
1158	0.0	0.0
1159	0.0	0.0
1160	0.0	0.0
1161	0.0	0.0
1162	0.0	0.0
1163	0.0	0.0
1164	0.0	0.0
1165	0.0	0.0
1166	0.0	0.0
1167	0.0	0.0

Closed rack

(2) EPA Engine Dynamometer Schedule For Heavy Duty Diesel Engines

DIESEL ENGINE PERCENT REVOLUTIONS PER MINUTE AND PERCENT TORQUE VERSUS TIME SEQUENCE

Record (sec)	Revolutions per minute	Torque
0	0.0	0.0
1	0.0	0.0
2	0.0	0.0
3	0.0	0.0
4	0.0	0.0
5	0.0	0.0
6	0.0	0.0
7	0.0	0.0
8	0.0	0.0
9	0.0	0.0
10	0.0	0.0
11	0.0	0.0
12	0.0	0.0
13	0.0	0.0
14	0.0	0.0
15	0.0	0.0
16	0.0	0.0
17	0.0	0.0
18	0.0	0.0
19	0.0	0.0
20	0.0	0.0
21	0.0	0.0

DIESEL ENGINE PERCENT REVOLUTIONS PER MINUTE AND PERCENT TORQUE VERSUS TIME SEQUENCE—Continued

Record (sec)	Revolutions per minute	Torque
22	0.0	0.0
23	0.0	0.0
24	0.0	0.0
25	0.0	3.67
26	0.0	47.69
27	3.11	59.41
28	9.09	84.54
29	15.62	80.00
30	33.49	80.00
31	37.93	79.29
32	31.20	38.25
33	21.99	26.67
34	30.00	15.10
35	22.23	16.47
36	19.61	28.05
37	20.00	20.38
38	18.33	(1)
39	6.55	(1)
40	15.82	(1)
41	23.63	(1)
42	17.51	(1)
43	14.19	62.52
44	16.64	69.36
45	27.77	60.00
46	37.03	63.79
47	47.36	75.36
48	54.77	80.00
49	57.70	80.00
50	54.03	79.92
51	58.00	65.03
52	58.65	43.23
53	62.88	50.00
54	69.83	50.00
55	72.00	42.05
56	75.81	40.00
57	84.22	42.20
58	83.86	41.28
59	80.55	(1)
60	80.51	(1)
61	78.00	(1)
62	79.79	(1)
63	80.33	30.54
64	85.58	42.12
65	81.78	50.00
66	78.00	50.00
67	80.74	43.16
68	92.10	73.65
69	88.01	(1)
70	84.00	(1)
71	84.00	(1)
72	81.17	(1)
73	70.46	(1)
74	66.00	13.57
75	62.23	29.43
76	64.00	20.00
77	63.48	17.42
78	60.34	10.00
79	56.85	10.00
80	56.00	(1)
81	52.45	(1)
82	39.91	10.00
83	36.38	10.00
84	30.00	10.00
85	27.93	10.00
86	26.00	16.74
87	27.66	3.36

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DIESEL ENGINE PERCENT REVOLUTIONS PER MINUTE AND PERCENT TORQUE VERSUS TIME SEQUENCE—Continued

Record (sec)	Revolutions per minute	Torque
88	28.00	(1)
89	27.41	(1)
90	20.96	(1)
91	12.15	(1)
92	3.81	(1)
93	0.0	0.0
94	0.0	0.0
95	0.0	0.91
96	0.0	7.52
97	0.0	0.0
98	0.0	0.0
99	0.0	0.0
100	0.0	0.0
101	0.0	0.0
102	0.0	0.0
103	0.0	0.0
104	0.0	0.0
105	0.0	0.0
106	0.0	0.0
107	0.0	0.0
108	0.0	0.0
109	0.0	0.0
110	0.0	0.0
111	0.0	0.0
112	0.0	0.0
113	0.0	0.0
114	0.0	0.0
115	0.0	0.0
116	0.0	0.0
117	0.0	0.0
118	0.0	0.0
119	0.0	0.0
120	0.0	0.0
121	0.0	0.0
122	0.0	0.0
123	0.0	0.0
124	0.0	0.0
125	0.0	0.0
126	0.0	0.0
127	0.0	0.0
128	0.0	0.0
129	1.77	(1)
130	1.60	(1)
131	0.0	0.0
132	0.0	0.0
133	2.14	9.28
134	3.08	0.0
135	0.0	0.0
136	0.0	0.0
137	0.0	0.0
138	0.0	0.0
139	0.0	0.0
140	0.0	0.0
141	0.0	0.0
142	0.0	0.0
143	0.0	0.0
144	0.0	0.0
145	0.0	0.0
146	0.0	0.0
147	0.0	5.51
148	0.0	11.34
149	0.0	0.0
150	0.0	0.0
151	0.0	0.0
152	0.0	0.0
153	0.0	0.0

DIESEL ENGINE PERCENT REVOLUTIONS PER MINUTE AND PERCENT TORQUE VERSUS TIME SEQUENCE—Continued

Record (sec)	Revolutions per minute	Torque
154	0.0	0.0
155	0.0	0.0
156	0.0	0.0
157	0.0	0.0
158	0.0	0.21
159	0.0	30.00
160	0.0	26.78
161	0.0	20.00
162	0.0	20.00
163	0.0	4.12
164	0.0	0.0
165	0.0	0.0
166	0.0	0.0
167	0.0	0.0
168	0.0	0.0
169	0.0	0.0
170	0.0	0.0
171	0.0	0.0
172	0.0	0.0
173	0.0	0.0
174	0.0	0.0
175	0.0	0.0
176	0.0	0.0
177	0.0	0.0
178	0.0	0.0
179	0.0	0.0
180	0.0	0.0
181	0.0	0.0
182	0.0	0.0
183	0.0	0.0
184	0.0	20.00
185	0.0	20.00
186	0.0	11.73
187	0.0	0.0
188	0.0	0.0
189	0.0	0.0
190	0.0	0.0
191	0.0	0.0
192	0.0	0.0
193	0.0	0.0
194	0.0	0.0
195	0.0	0.0
196	0.0	0.0
197	0.0	0.0
198	0.0	0.0
199	0.0	0.0
200	0.0	0.0
201	0.0	0.0
202	0.0	0.0
203	0.0	0.0
204	0.0	0.0
205	0.0	0.0
206	0.0	0.0
207	0.0	0.0
208	0.0	0.0
209	0.0	0.0
210	0.0	0.0
211	0.0	0.0
212	0.0	0.0
213	0.0	0.0
214	0.0	73.41
215	0.0	90.00
216	31.30	81.30
217	41.15	90.00
218	44.00	90.00
219	46.41	90.00

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DIESEL ENGINE PERCENT REVOLUTIONS PER MINUTE AND PERCENT TORQUE VERSUS TIME SEQUENCE—Continued

Record (sec)	Revolutions per minute	Torque
220	51.04	82.41
221	66.66	80.00
222	75.03	90.00
223	89.85	90.00
224	96.78	93.88
225	96.91	50.94
226	94.60	17.02
227	99.16	28.60
228	100.00	39.83
229	100.00	30.00
230	100.00	26.69
231	100.98	20.00
232	100.71	20.00
233	100.00	36.06
234	96.16	40.00
235	95.77	30.00
236	94.55	32.75
237	96.86	35.68
238	99.18	30.00
239	100.00	44.93
240	101.81	50.00
241	86.54	(1)
242	63.56	(1)
243	56.00	(1)
244	46.00	(1)
245	41.86	45.18
246	38.31	78.47
247	35.98	80.00
248	31.03	80.00
249	25.36	80.00
250	23.05	60.97
251	18.20	27.34
252	12.84	43.71
253	10.10	68.95
254	3.79	68.95
255	1.48	44.28
256	0.0	0.0
257	0.0	0.0
258	0.0	0.0
259	0.0	0.0
260	0.0	0.0
261	0.0	0.0
262	0.0	0.0
263	0.0	24.97
264	0.0	17.16
265	0.0	6.20
266	0.0	10.00
267	0.0	10.00
268	0.0	0.0
269	0.0	0.0
270	0.0	0.0
271	0.0	0.0
272	0.0	0.0
273	0.0	0.0
274	0.0	0.0
275	0.0	0.0
276	0.0	0.0
277	0.0	0.0
278	0.0	0.0
279	0.0	0.0
280	0.0	0.0
281	0.0	0.0
282	0.0	0.0
283	0.0	0.0
284	0.0	0.0
285	0.0	0.0

DIESEL ENGINE PERCENT REVOLUTIONS PER MINUTE AND PERCENT TORQUE VERSUS TIME SEQUENCE—Continued

Record (sec)	Revolutions per minute	Torque
286	0.0	0.0
287	0.0	0.0
288	0.0	0.0
289	0.0	0.0
290	0.0	0.0
291	0.0	0.0
292	0.0	0.0
293	0.0	0.0
294	0.0	0.0
295	0.0	0.0
296	0.0	0.0
297	0.0	0.0
298	0.0	0.0
299	0.0	0.0
300	0.0	0.0
301	0.0	0.0
302	0.0	0.0
303	0.0	0.0
304	0.0	0.0
305	0.0	0.0
306	0.0	0.0
307	0.0	0.0
308	0.0	0.0
309	0.0	0.0
310	0.0	0.0
311	0.0	0.0
312	0.0	0.0
313	0.0	0.0
314	0.0	0.0
315	0.0	0.0
316	0.0	0.0
317	0.0	0.0
318	0.0	0.0
319	0.0	0.0
320	0.0	0.0
321	0.0	15.55
322	0.0	20.00
323	24.18	19.08
324	23.00	10.00
325	11.56	1.86
326	6.87	(1)
327	6.00	(1)
328	0.72	(1)
329	0.0	0.0
330	0.0	0.0
331	0.0	0.0
332	0.0	0.0
333	0.0	0.0
334	0.0	0.0
335	0.0	0.0
336	0.0	0.0
337	0.0	0.0
338	0.0	0.0
339	0.0	0.0
340	0.0	0.0
341	0.0	0.0
342	0.0	0.0
343	0.0	0.0
344	0.0	0.0
345	0.0	0.0
346	0.0	0.0
347	0.0	0.0
348	0.0	0.0
349	0.0	0.0
350	0.0	0.0
351	0.0	0.0

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DIESEL ENGINE PERCENT REVOLUTIONS PER MINUTE AND PERCENT TORQUE VERSUS TIME SEQUENCE—Continued

Record (sec)	Revolutions per minute	Torque
352	0.0	0.0
353	0.0	0.0
354	0.0	0.0
355	0.0	0.0
356	0.0	0.0
357	0.0	0.0
358	0.0	0.0
359	0.0	0.0
360	0.0	0.0
361	0.0	0.0
362	0.0	0.0
363	0.0	0.0
364	0.0	0.0
365	0.0	0.0
366	0.0	0.0
367	0.0	0.0
368	0.0	0.0
369	0.0	0.0
370	0.0	0.0
371	0.0	0.0
372	0.0	0.0
373	0.0	0.0
374	0.0	0.0
375	0.0	0.0
376	0.0	0.0
377	0.0	29.59
378	1.50	87.46
379	8.88	100.00
380	46.04	100.00
381	76.89	100.00
382	80.00	100.00
383	82.14	94.64
384	85.39	83.07
385	87.70	88.51
386	92.00	79.83
387	92.00	61.66
388	94.58	66.77
389	102.88	60.00
390	106.00	72.76
391	109.18	8.43
392	111.91	(1)
393	82.00	(1)
394	79.33	(1)
395	71.15	(1)
396	68.84	(1)
397	78.35	49.17
398	82.00	70.00
399	80.65	69.46
400	92.85	60.00
401	97.48	60.00
402	98.95	60.00
403	100.74	60.00
404	103.68	43.17
405	104.00	10.04
406	80.62	20.00
407	83.37	20.00
408	81.06	15.29
409	80.00	10.00
410	76.86	(1)
411	74.11	(1)
412	71.60	(1)
413	70.58	(1)
414	78.00	(1)
415	80.29	1.45
416	80.54	17.30
417	78.23	11.13

DIESEL ENGINE PERCENT REVOLUTIONS PER MINUTE AND PERCENT TORQUE VERSUS TIME SEQUENCE—Continued

Record (sec)	Revolutions per minute	Torque
418	78.45	19.55
419	84.36	24.16
420	72.16	80.00
421	79.10	74.83
422	90.09	16.04
423	74.04	(1)
424	68.02	(1)
425	68.53	(1)
426	59.39	(1)
427	63.54	(1)
428	70.00	2.38
429	73.10	17.76
430	72.13	(1)
431	67.27	(1)
432	36.03	(1)
433	20.75	(1)
434	11.49	(1)
435	2.09	0.0
436	0.73	0.0
437	8.57	60.00
438	30.55	61.93
439	67.10	63.00
440	86.03	39.85
441	89.33	30.00
442	91.64	30.00
443	97.88	10.40
444	97.73	1.37
445	96.00	10.00
446	96.00	0.96
447	96.00	(1)
448	85.27	28.34
449	87.54	30.76
450	86.16	29.18
451	88.00	20.00
452	87.21	20.00
453	86.00	20.00
454	87.42	20.00
455	88.00	11.32
456	77.84	(1)
457	72.00	(1)
458	71.32	(1)
459	70.00	0.04
460	70.00	(1)
461	74.88	(1)
462	74.06	(1)
463	67.74	(1)
464	66.00	(1)
465	64.23	(1)
466	62.00	(1)
467	55.94	(1)
468	54.00	(1)
469	66.43	(1)
470	75.21	70.00
471	86.00	54.53
472	86.00	24.56
473	88.81	(1)
474	90.00	(1)
475	105.48	(1)
476	74.00	(1)
477	73.34	(1)
478	71.02	10.00
479	76.46	29.38
480	81.61	40.00
481	78.16	30.39
482	74.13	26.46
483	90.00	0.0

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DIESEL ENGINE PERCENT REVOLUTIONS PER MINUTE AND PERCENT TORQUE VERSUS TIME SEQUENCE—Continued

Record (sec)	Revolutions per minute	Torque
484	90.87	0.0
485	92.00	(1)
486	93.50	(1)
487	94.00	(1)
488	94.13	(1)
489	88.96	(1)
490	63.25	(1)
491	62.00	(1)
492	49.54	45.37
493	52.49	86.99
494	64.00	90.00
495	64.99	90.00
496	71.93	93.22
497	78.87	95.21
498	82.00	83.64
499	86.76	80.00
500	93.71	80.00
501	94.87	80.00
502	103.60	80.00
503	101.23	41.89
504	95.48	24.85
505	98.00	50.00
506	99.79	50.00
507	106.21	46.82
508	110.84	(1)
509	98.55	(1)
510	70.95	(1)
511	67.27	(1)
512	60.96	(1)
513	48.03	(1)
514	52.31	(1)
515	54.00	(1)
516	65.27	(1)
517	78.00	(1)
518	57.61	(1)
519	42.58	(1)
520	38.81	(1)
521	22.37	(1)
522	3.52	(1)
523	0.0	0.0
524	1.46	36.39
525	0.23	5.75
526	0.0	0.0
527	0.0	0.0
528	0.0	0.0
529	0.0	0.0
530	0.0	0.0
531	0.0	0.0
532	0.0	0.0
533	0.0	0.0
534	0.0	0.0
535	0.0	0.0
536	0.0	0.0
537	0.0	0.0
538	0.0	0.0
539	0.0	0.0
540	0.0	0.0
541	0.0	0.0
542	0.0	0.0
543	0.0	0.0
544	0.0	(1)
545	0.0	0.0
546	0.75	0.0
547	0.56	0.0
548	4.00	(1)
549	0.68	(1)

DIESEL ENGINE PERCENT REVOLUTIONS PER MINUTE AND PERCENT TORQUE VERSUS TIME SEQUENCE—Continued

Record (sec)	Revolutions per minute	Torque
550	0.0	0.0
551	0.0	0.0
552	0.0	2.60
553	0.0	20.00
554	0.0	20.00
555	0.0	7.96
556	0.0	0.0
557	0.0	0.0
558	0.0	78.53
559	1.85	60.00
560	11.10	63.88
561	16.00	70.00
562	30.05	70.00
563	42.88	70.00
564	56.10	70.00
565	63.39	66.52
566	70.66	59.94
567	72.98	80.00
568	77.87	86.46
569	88.03	90.00
570	90.00	90.00
571	92.23	100.00
572	94.00	100.00
573	94.86	100.00
574	96.00	100.00
575	97.49	100.00
576	108.84	100.00
577	110.00	83.92
578	104.77	(1)
579	87.50	(1)
580	90.00	0.0
581	91.38	(1)
582	81.84	(1)
583	65.99	(1)
584	63.68	(1)
585	60.73	(1)
586	57.05	(1)
587	53.47	(1)
588	50.42	(1)
589	44.31	(1)
590	37.58	37.91
591	33.48	20.00
592	31.16	20.00
593	28.85	20.00
594	22.13	20.00
595	9.31	(1)
596	0.0	0.0
597	0.0	0.0
598	0.0	0.0
599	0.0	0.0
600	0.0	0.0
601	0.0	0.0
602	0.0	0.0
603	0.0	0.0
604	0.0	0.0
605	0.0	0.0
606	2.52	6.30
607	10.30	17.87
608	13.89	20.00
609	20.20	20.00
610	24.07	22.59
611	33.33	17.50
612	40.30	(1)
613	47.85	(1)
614	66.00	7.78
615	68.00	10.93

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DIESEL ENGINE PERCENT REVOLUTIONS PER MINUTE AND PERCENT TORQUE VERSUS TIME SEQUENCE—Continued

Record (sec)	Revolutions per minute	Torque
616	67.59	32.04
617	66.00	40.00
618	67.04	40.00
619	68.00	40.00
620	68.00	48.33
621	75.93	99.53
622	78.00	100.00
623	78.00	100.00
624	77.07	100.00
625	76.00	100.00
626	76.00	100.00
627	76.00	100.00
628	75.63	100.00
629	73.00	97.50
630	76.81	90.00
631	80.26	90.00
632	83.44	90.00
633	84.00	98.79
634	84.00	100.00
635	83.61	100.00
636	82.00	100.00
637	83.02	94.91
638	86.67	90.00
639	89.65	90.00
640	90.00	99.81
641	89.45	100.00
642	86.00	100.00
643	86.00	95.47
644	87.22	90.00
645	88.00	90.00
646	88.00	80.74
647	88.00	79.17
648	88.00	77.21
649	88.00	100.00
650	88.00	94.45
651	88.00	90.00
652	88.00	90.00
653	90.00	90.00
654	89.63	90.00
655	88.68	90.00
656	90.00	90.00
657	90.00	90.00
658	91.63	81.86
659	92.00	80.00
660	90.00	81.29
661	89.43	92.86
662	87.11	100.00
663	86.00	100.00
664	86.00	100.00
665	89.66	100.00
666	90.00	99.27
667	90.46	90.00
668	92.78	90.00
669	95.09	90.00
670	100.22	82.97
671	102.00	80.00
672	102.00	70.18
673	102.00	80.00
674	97.34	50.07
675	87.02	(1)
676	86.00	(1)
677	73.12	22.19
678	75.77	39.62
679	75.76	48.80
680	75.11	37.23
681	78.00	34.34

DIESEL ENGINE PERCENT REVOLUTIONS PER MINUTE AND PERCENT TORQUE VERSUS TIME SEQUENCE—Continued

Record (sec)	Revolutions per minute	Torque
682	80.37	40.00
683	77.51	47.49
684	81.44	50.00
685	82.13	39.36
686	84.00	27.79
687	84.00	16.21
688	84.00	15.36
689	85.39	26.93
690	86.00	30.00
691	86.00	30.08
692	85.67	40.00
693	84.65	40.00
694	86.00	35.20
695	87.28	30.00
696	88.00	22.05
697	86.09	(1)
698	83.78	(1)
699	81.47	(1)
700	81.70	(1)
701	85.16	(1)
702	84.52	(1)
703	82.21	(1)
704	79.89	(1)
705	77.58	(1)
706	76.00	6.31
707	79.16	0.0
708	75.16	27.36
709	72.00	40.00
710	72.00	40.00
711	74.00	38.44
712	74.00	30.00
713	74.00	30.00
714	74.00	36.28
715	72.43	47.86
716	68.23	59.43
717	73.80	50.00
718	72.52	50.00
719	74.00	45.85
720	72.85	57.18
721	76.38	62.70
722	81.55	60.00
723	80.18	60.00
724	83.60	60.00
725	93.44	56.40
726	96.00	50.00
727	97.35	50.00
728	86.34	50.00
729	86.00	40.11
730	88.29	61.47
731	88.78	63.92
732	88.92	50.00
733	86.76	50.00
734	87.55	42.24
735	88.00	49.34
736	86.00	50.91
737	86.00	67.45
738	86.00	81.88
739	87.13	70.00
740	89.44	77.21
741	91.76	88.78
742	90.07	89.65
743	92.00	80.00
744	92.70	80.00
745	94.00	80.00
746	94.00	80.00
747	94.00	80.00

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DIESEL ENGINE PERCENT REVOLUTIONS PER MINUTE AND PERCENT TORQUE VERSUS TIME SEQUENCE—Continued

Record (sec)	Revolutions per minute	Torque
748	94.00	80.00
749	94.00	81.37
750	94.59	87.05
751	96.00	57.40
752	96.00	42.19
753	96.00	42.33
754	96.00	40.00
755	96.00	38.37
756	96.00	12.83
757	96.00	(1)
758	96.00	(1)
759	96.00	(1)
760	97.74	7.37
761	100.05	19.74
762	102.00	11.83
763	102.00	26.81
764	103.00	49.96
765	104.00	60.00
766	102.37	60.00
767	103.94	60.00
768	104.00	40.00
769	104.00	25.75
770	103.12	(1)
771	100.80	(1)
772	100.00	(1)
773	101.83	44.88
774	102.00	36.40
775	102.00	(1)
776	102.00	(1)
777	100.91	(1)
778	101.40	(1)
779	100.28	(1)
780	97.97	(1)
781	96.00	(1)
782	96.00	10.00
783	96.00	0.23
784	96.00	(1)
785	96.00	(1)
786	94.08	(1)
787	78.00	(1)
788	77.45	(1)
789	71.67	28.96
790	67.18	80.00
791	66.50	87.48
792	71.43	90.00
793	74.13	90.00
794	75.56	92.20
795	74.75	100.00
796	77.07	94.65
797	79.38	83.08
798	80.00	71.51
799	80.01	69.93
800	82.33	58.36
801	84.00	50.00
802	84.00	59.58
803	84.00	76.36
804	84.00	80.00
805	84.00	70.49
806	82.00	80.00
807	81.47	82.66
808	80.00	90.00
809	77.68	90.00
810	74.52	75.24
811	77.58	78.96
812	81.89	80.00
813	80.42	80.00

DIESEL ENGINE PERCENT REVOLUTIONS PER MINUTE AND PERCENT TORQUE VERSUS TIME SEQUENCE—Continued

Record (sec)	Revolutions per minute	Torque
814	82.00	83.68
815	83.05	79.50
816	84.00	70.00
817	84.00	61.60
818	84.00	50.03
819	86.00	60.00
820	86.00	60.00
821	86.00	69.39
822	88.51	73.73
823	88.43	70.00
824	88.00	70.00
825	94.00	70.99
826	94.51	80.00
827	95.17	80.00
828	95.14	80.00
829	94.54	80.00
830	94.00	80.00
831	94.00	77.89
832	94.00	31.99
833	94.00	43.57
834	94.00	60.28
835	94.00	63.29
836	94.00	76.57
837	94.00	89.86
838	94.29	90.00
839	97.80	87.00
840	102.91	80.00
841	104.00	73.85
842	104.00	62.28
843	104.00	69.29
844	106.00	70.00
845	106.00	62.70
846	106.00	40.00
847	104.88	40.00
848	104.00	32.85
849	104.00	30.00
850	104.00	0.30
851	103.63	11.87
852	100.62	13.12
853	98.00	5.01
854	96.68	10.00
855	96.00	(1)
856	96.00	(1)
857	96.00	(1)
858	95.43	(1)
859	94.00	(1)
860	94.00	(1)
861	95.52	5.18
862	97.83	(1)
863	98.00	(1)
864	98.00	(1)
865	97.22	(1)
866	96.00	6.35
867	96.00	12.98
868	96.00	10.00
869	95.93	10.00
870	92.00	10.00
871	92.00	10.00
872	92.98	14.89
873	94.00	13.54
874	90.79	42.12
875	88.08	40.40
876	86.23	30.00
877	88.00	32.75
878	87.14	44.32
879	84.82	50.00

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DIESEL ENGINE PERCENT REVOLUTIONS PER MINUTE AND PERCENT TORQUE VERSUS TIME SEQUENCE—Continued

Record (sec)	Revolutions per minute	Torque
880	82.51	50.00
881	82.00	50.00
882	82.12	40.00
883	83.13	35.64
884	80.00	20.00
885	84.26	51.95
886	86.62	66.21
887	84.31	60.00
888	81.99	9.96
889	79.35	1.61
890	75.36	19.56
891	73.05	40.00
892	70.73	8.35
893	68.42	(1)
894	47.15	8.95
895	35.79	10.00
896	32.95	7.38
897	29.16	(1)
898	16.47	(1)
899	2.13	(1)
900	0.0	0.0
901	0.0	0.0
902	0.0	0.0
903	0.0	0.0
904	0.0	0.0
905	0.0	0.0
906	0.0	0.0
907	0.0	0.0
908	0.0	0.0
909	0.0	0.0
910	0.0	0.0
911	0.0	0.0
912	0.0	0.0
913	0.0	0.0
914	0.0	0.0
915	0.0	0.0
916	0.0	0.0
917	0.0	0.0
918	0.0	0.0
919	0.0	0.0
920	0.0	0.0
921	0.0	0.0
922	0.0	0.0
923	0.0	0.0
924	0.0	0.0
925	0.0	0.0
926	0.0	0.0
927	0.0	3.67
928	0.0	47.69
929	3.11	59.41
930	9.09	84.54
931	15.62	80.00
932	33.49	80.00
933	37.93	79.29
934	31.20	38.25
935	21.99	26.67
936	30.00	15.10
937	22.23	16.47
938	19.61	28.05
939	20.00	20.38
940	18.33	(1)
941	6.55	(1)
942	15.82	(1)
943	23.63	(1)
944	17.51	(1)

DIESEL ENGINE PERCENT REVOLUTIONS PER MINUTE AND PERCENT TORQUE VERSUS TIME SEQUENCE—Continued

Record (sec)	Revolutions per minute	Torque
945	14.19	62.52
946	16.64	69.36
947	27.77	60.00
948	37.03	63.79
949	47.36	75.36
950	54.77	80.00
951	54.70	80.00
952	54.03	79.92
953	58.00	65.03
954	58.65	43.23
955	62.88	50.00
956	69.83	50.00
957	72.00	42.05
958	75.81	40.00
959	84.22	42.20
960	83.86	41.28
961	80.55	(1)
962	80.51	(1)
963	78.00	(1)
964	79.79	(1)
965	80.33	30.54
966	85.58	42.12
967	81.78	50.00
968	78.00	50.00
969	80.74	43.16
970	92.10	73.65
971	88.01	(1)
972	84.00	(1)
973	84.00	(1)
974	81.17	(1)
975	70.46	(1)
976	66.00	13.57
977	62.23	29.43
978	64.00	20.00
979	63.48	17.42
980	60.34	10.00
981	56.85	10.00
982	56.00	(1)
983	52.45	(1)
984	39.91	10.00
985	36.38	10.00
986	30.00	10.00
987	27.93	10.00
988	26.00	16.74
989	27.66	3.36
990	28.00	(1)
991	27.41	(1)
992	20.96	(1)
993	12.15	(1)
994	3.81	(1)
995	0.0	0.0
996	0.0	0.0
997	0.0	0.91
998	0.0	7.52
999	0.0	0.0
1000	0.0	0.0
1001	0.0	0.0
1002	0.0	0.0
1003	0.0	0.0
1004	0.0	0.0
1005	0.0	0.0
1006	0.0	0.0
1007	0.0	0.0
1008	0.0	0.0
1009	0.0	0.0
1010	0.0	0.0

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DIESEL ENGINE PERCENT REVOLUTIONS PER MINUTE AND PERCENT TORQUE VERSUS TIME SEQUENCE—Continued

Record (sec)	Revolutions per minute	Torque
1011	0.0	0.0
1012	0.0	0.0
1013	0.0	0.0
1014	0.0	0.0
1015	0.0	0.0
1016	0.0	0.0
1017	0.0	0.0
1018	0.0	0.0
1019	0.0	0.0
1020	0.0	0.0
1021	0.0	0.0
1022	0.0	0.0
1023	0.0	0.0
1024	0.0	0.0
1025	0.0	0.0
1026	0.0	0.0
1027	0.0	0.0
1028	0.0	0.0
1029	0.0	0.0
1030	0.0	0.0
1031	1.77	(1)
1032	1.60	(1)
1033	0.0	0.0
1034	0.0	0.0
1035	2.14	9.28
1036	3.08	0.0
1037	0.0	0.0
1038	0.0	0.0
1039	0.0	0.0
1040	0.0	0.0
1041	0.0	0.0
1042	0.0	0.0
1043	0.0	0.0
1044	0.0	0.0
1045	0.0	0.0
1046	0.0	0.0
1047	0.0	0.0
1048	0.0	0.0
1049	0.0	5.51
1050	0.0	11.34
1051	0.0	0.0
1052	0.0	0.0
1053	0.0	0.0
1054	0.0	0.0
1055	0.0	0.0
1056	0.0	0.0
1057	0.0	0.0
1058	0.0	0.0
1059	0.0	0.0
1060	0.0	0.21
1061	0.0	30.00
1062	0.0	26.78
1063	0.0	20.00
1064	0.0	20.00
1065	0.0	4.12
1066	0.0	0.0
1067	0.0	0.0
1068	0.0	0.0
1069	0.0	0.0
1070	0.0	0.0
1071	0.0	0.0
1072	0.0	0.0
1073	0.0	0.0
1074	0.0	0.0
1075	0.0	0.0
1076	0.0	0.0

DIESEL ENGINE PERCENT REVOLUTIONS PER MINUTE AND PERCENT TORQUE VERSUS TIME SEQUENCE—Continued

Record (sec)	Revolutions per minute	Torque
1077	0.0	0.0
1078	0.0	0.0
1079	0.0	0.0
1080	0.0	0.0
1081	0.0	0.0
1082	0.0	0.0
1083	0.0	0.0
1084	0.0	0.0
1085	0.0	0.0
1086	0.0	20.00
1087	0.0	20.00
1088	0.0	11.73
1089	0.0	0.0
1090	0.0	0.0
1091	0.0	0.0
1092	0.0	0.0
1093	0.0	0.0
1094	0.0	0.0
1095	0.0	0.0
1096	0.0	0.0
1097	0.0	0.0
1098	0.0	0.0
1099	0.0	0.0
1100	0.0	0.0
1101	0.0	0.0
1102	0.0	0.0
1103	0.0	0.0
1104	0.0	0.0
1105	0.0	0.0
1106	0.0	0.0
1107	0.0	0.0
1108	0.0	0.0
1109	0.0	0.0
1110	0.0	0.0
1111	0.0	0.0
1112	0.0	0.0
1113	0.0	0.0
1114	0.0	0.0
1115	0.0	0.0
1116	0.0	73.41
1117	0.0	90.00
1118	31.30	81.30
1119	41.15	90.00
1120	44.00	90.00
1121	46.41	90.00
1122	51.04	82.41
1123	56.66	80.00
1124	75.03	90.00
1125	89.85	90.00
1126	96.78	93.88
1127	96.91	50.94
1128	94.60	17.02
1129	99.16	28.60
1130	100.00	39.83
1131	100.00	30.00
1132	100.00	26.69
1133	100.98	20.00
1134	100.71	20.00
1135	100.00	36.06
1136	96.16	40.00
1137	95.77	30.00
1138	94.55	32.75
1139	96.86	35.68
1140	99.18	30.00
1141	100.00	44.93
1142	101.81	50.00

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DIESEL ENGINE PERCENT REVOLUTIONS PER MINUTE AND PERCENT TORQUE VERSUS TIME SEQUENCE—Continued

Record (sec)	Revolutions per minute	Torque
1143	86.54	(1)
1144	63.56	(1)
1145	56.00	(1)
1146	46.00	(1)
1147	41.86	45.18
1148	38.31	78.47
1149	35.98	80.00
1150	31.03	80.00
1151	25.36	80.00
1152	23.05	60.97
1153	18.20	27.34
1154	12.84	43.71
1155	10.10	68.95
1156	3.79	68.95
1157	1.48	44.28
1158	0.0	0.0
1159	0.0	0.0
1160	0.0	0.0
1161	0.0	0.0
1162	0.0	0.0
1163	0.0	0.0
1164	0.0	0.0
1165	0.0	24.97
1166	0.0	17.16
1167	0.0	6.20
1168	0.0	10.00
1169	0.0	10.00
1170	0.0	0.0
1171	0.0	0.0
1172	0.0	0.0
1173	0.0	0.0
1174	0.0	0.0
1175	0.0	0.0
1176	0.0	0.0
1177	0.0	0.0
1178	0.0	0.0
1179	0.0	0.0
1180	0.0	0.0
1181	0.0	0.0
1182	0.0	0.0
1183	0.0	0.0
1184	0.0	0.0
1185	0.0	0.0
1186	0.0	0.0
1187	0.0	0.0
1188	0.0	0.0
1189	0.0	0.0
1190	0.0	0.0
1191	0.0	0.0
1192	0.0	0.0
1193	0.0	0.0
1194	0.0	0.0
1195	0.0	0.0
1196	0.0	0.0
1197	0.0	0.0
1198	0.0	0.0
1199	0.0	0.0

(1) Closed Rack

[42 FR 32989, June 28, 1977, as amended at 43 FR 52924, Nov. 14, 1978; 45 FR 4214, Jan. 21, 1980]

APPENDIX II—PROCEDURE FOR DYNAMOMETER ROAD HORSEPOWER CALIBRATION

This appendix describes the method for determining the road horsepower absorbed by a chassis dynamometer. The measured absorbed road horsepower includes the dynamometer friction as well as the power absorbed by the power absorption unit. The dynamometer is driven above the test speed range. The device used to drive the dynamometer is then disengaged from the dynamometer and the roll(s) is allowed to coast down. The kinetic energy of the system is dissipated by the dynamometer friction and absorption unit. This method neglects the variations in roll bearing friction due to the drive axle weight of the vehicle. The difference in coast down time of the free (rear) roll relative to the drive (front) roll may be neglected in the case of dynamometers with paired rolls.

These procedures shall be followed:

1. Devise a method to determine the speed of the drive roll if not already measured. A fifth wheel, revolution pickup or other suitable means may be used.

2. Place a vehicle on the dynamometer or devise another method of driving the dynamometer.

3. Engage inertia flywheel for the most common vehicle weight class for which the dynamometer is used.

4. Drive dynamometer up to 50 m.p.h.

5. Record indicated road horsepower.

6. Drive dynamometer up to 60 m.p.h.

7. Disengage the device used to drive the dynamometer.

8. Record the time for the dynamometer drive roll to coast down from 55 m.p.h. to 45 m.p.h.

9. Adjust the power absorption unit to a different level.

10. Repeat steps 4 to 9 above sufficient times to cover the range of road horsepower used.

11. Calculate absorbed road horsepower from:

$HP_d = (1/2)(W_i/32.2)(V_1^2 V_2^2)/(550t)$

$HP_d = 0.06073(W_i/t)$

Where:

W_i Equivalent inertia in lb.

V_1 Initial velocity in ft./sec. (55 m.p.h. 80.67ft./sec.).

V_2 Final velocity in ft./sec. (45 m.p.h. 66 ft./sec.).

t Elapsed time for rolls to coast from 55 m.p.h. to 45 m.p.h.

12. Plot indicated road load horsepower at 50 m.p.h. versus road load horsepower at 50 m.p.h.

13. The road load horsepower reported in § 86.177-11 is obtained by entering the plot

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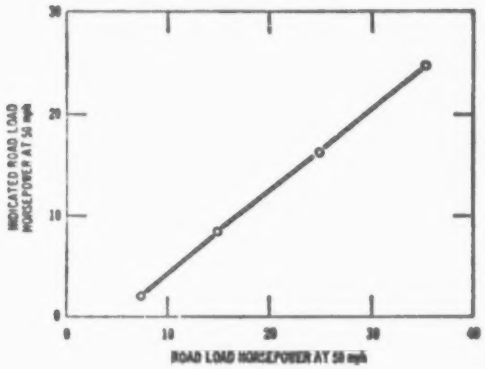
at the indicated road load horsepower determined in § 86.177 (e)(1).



EXAMPLE: Dynamometer calibration curve (Ser. No. CR-256-R) 6-24-68

14. Once the road load horsepower at 50 m.p.h. is known for a vehicle, it may be tested on other dynamometers using a similar calibration.

[42 FR 33000, June 28, 1977]

Appendix III—Constant Volume Sampler Flow Calibration

The following calibration procedure outlines the equipment, the test setup configuration, and the various parameters which must be measured to establish the flow rate of the constant volume sampler pump. All the parameters related to the pump are simultaneously measured with the parameters related to a flowmeter which is connected in series with the pump. The calculated flow rate (ft³/rev@ pump inlet absolute pressure and temperature) can then be plotted versus a correlation function which is the value of a specific combination of pump parameters. The linear equation which relates the pump flow and the correlation function is then determined. In the event that a CVS has a multiple speed drive, a calibration for each range should be performed.

This calibration procedure is based on the measurement of the absolute values of the pump and flowmeter parameters that relate the flow rate at each point. Three conditions must be maintained to assure the accuracy and integrity of the calibration curve. First, the pump pressures should be measured at taps on the pump rather than at the external piping on the pump inlet and outlet. Pressure taps that are mounted at the top and bottom center of the pump drive headplate are exposed to the actual pump cavity pressures, and therefore reflect the absolute pressure differentials. Secondly, temperature stability must be maintained during the calibration. The laminar flowmeter is sensitive to inlet temperature oscillations which cause the data points to be scattered. Gradual changes (± 2°F) in temperature are acceptable as long as they occur over a period of several minutes. Finally, all connections between the flowmeter and the CVS pump must be absolutely void of any leakage.

During a CVS emissions test the measurement of these same pump parameters enables the user to calculate the flow rate from the calibration equation.

After the calibration curve has been obtained, a verification test of the entire system can be performed by injecting a known mass of gas into the system and comparing the mass indicated by the system to the true mass injected. An indicated error does not necessarily mean that the calibration is wrong, since other factors can influence the accuracy of the system.

Equipment:

The following list of equipment will be needed to perform this calibration procedure. Figure 1 illustrates a typical equipment arrangement used for calibration. All of the equipment involved should conform to the range and accuracy as specified in Figure 1.

Equipment List:

1. LFE—Laminar Flowmeter
2. Micromanometer
3. Thermometer
4. Timer
5. U-Tube Manometers
6. Temperature Indicator with type J Thermocouples
7. A variable flow restrictor with appropriate piping to connect the CVS pump and LFE.

After the system has been connected as shown in Figure 1, set the variable restrictor in the wide open position and run the CVS pump for twenty minutes. Record the calibration data.

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CALIBRATION DATA MEASUREMENTS

Parameter	Symbol	Units	Tolerance
Barometric pressure (corrected)	P_B	Hg	± .01 "Hg
Ambient temperature	T_A	F	± 5 F
Air Temperature into LFE	ETI	F	± 1 F
Pressure depression upstream of LFE	EPI	H20	± 1"H20
Pressure drop across the LFE matrix	EDP	H20	± .005"H20
Air temperature at CVS pump inlet	PTI	F	± 5 F
Pressure depression at CVS pump inlet	PPI	Fluid	± .05"Fluid
Specific gravity of manometer fluid	Sp. Gr.		
Pressure head at CVS pump outlet	PPO	"Fluid	± .05"Fluid
Air temperature at CVS pump outlet (optional)	PTO	F	± 5 F
Pump revolutions during test period	N	Revs	None
Elapsed time for test period	t	Seconds	± .05 Seconds

NOTE.—The fluid level in the manometer tube should stabilize before the reading is made and the elapsed time for revolution counting should be greater than 120 seconds.

Reset the restrictor valve to a more restricted condition in an increment of pump inlet depression (about 4" H_2O) that will yield a minimum of six data points for the total calibration.

Allow the system to stabilize for 3 minutes and repeat the data acquisition.

Data Analysis:

The data recorded during the calibration are to be used in the following calculations.

1. The air flow rate at each test point is calculated in standard cubic feet per minute (Qs) from the flowmeter data using the manufacturer's prescribed method.

2. The air flow rate is then converted to pump flow, Vo, in cubic feet per revolution at absolute pump inlet temperature and pressure.

$$V_o = Qs/n \cdot T_p/530 \cdot 29.92/P_p$$

Where:

Qs = Meter air flow rate in standard cubic feet per minute (flowmeter standard conditions are 70 F, 29.92 "Hg).

n = Pump speed in revolutions per minute.

P_p = Absolute pump inlet pressure, in ("Hg).

$P_p = P_B - PPI$ (SP.GR./13.57), $T_p = PTI + 460$.

3. The correlation function at each test point is then calculated from the calibration data, as follows:

$$X_o = \frac{1}{n}\sqrt{\frac{\Delta P_p}{P_e}}$$

ΔP_p = The pressure differential from pump inlet to pump outlet in ("Hg).

$$\Delta P_p = P_e - P_p$$

P_e = Absolute pump outlet pressure, in ("Hg).

$$P_e = P_B + PPO \text{ (Sp. Gr./13.57)}$$

See § 86.177-22 for other definitions.

4. A linear least squares fit is performed to generate the calibration equations which have the forms

$$V_o = D_o - M(X_o)$$
$$n = A - B(P_p)$$

Do, M, A, and B are the slope-intercept constants describing the lines.

A CVS system that has multiple speeds should be calibrated on each speed used. The calibration curves generated for the ranges will be approximately parallel and the intercept values, D_o, will increase as the pump flow range decreases.

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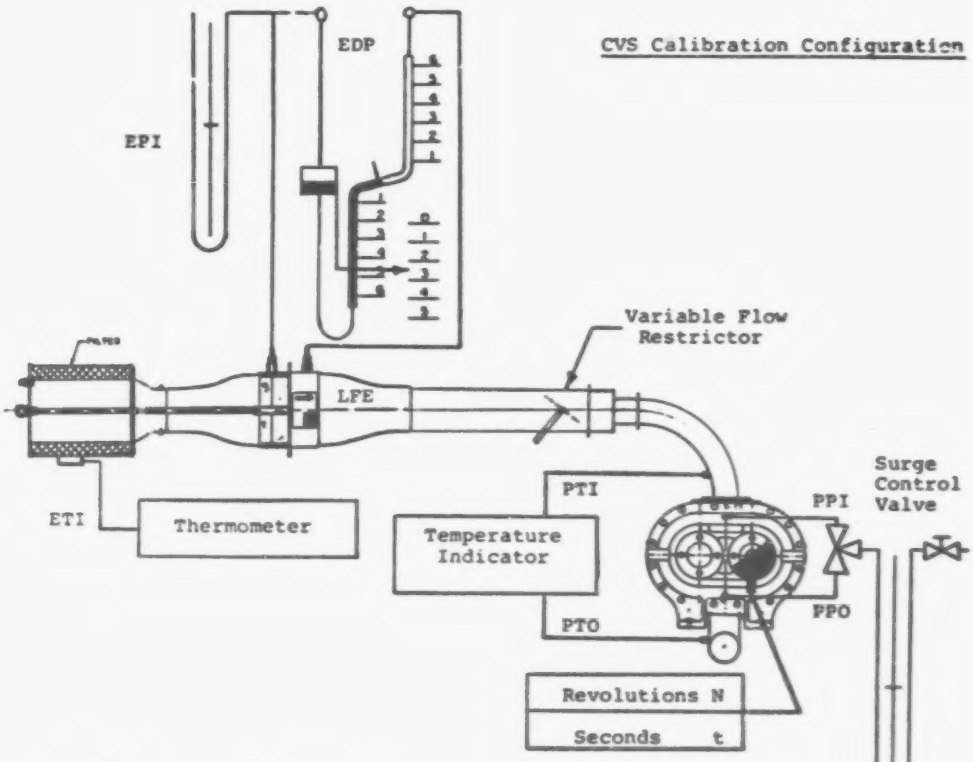

Unit		Range	Accuracy
	ETI	0-100 °F	± .1 °F
LFE	EPI	0-10 "H_2O	± .1 "H_2O
	EDP	0-10 "H_2O	± .005 "H_2O
	PTI	0-250 °F	± .5 °F
	PPI	0-36 "Fluid	± .05 "Fluid
	PPO	0-36 "Fluid	± .05 "Fluid
Pump	PTO	0-250 °F	± .5 °F
	N	0-100,000	± 0
	t	0-10,000 secs.	± .05 secs.

Note: Fluid used in 36 inch manometer should extend range to at least 0-60 "H_2O. Separate manometers for PPI and PPO may be used during calibration.

Figure I—CVS Calibration Configuration

If the calibration has been performed carefully, the calculated V_o values from the equation will be within ±.50% of the measured value of V_o. Values of M will vary from one pump to another, but values of D_o for pumps of the same make, model, and range should agree within ±3 percent of each other. Particulate influx from use will cause the pump slip to decrease as reflected by lower values for M. Calibrations should be performed at 0, 30, 100, 200, 400, etc. hours of pump operation to assure the stability of the pump slip rate. Analysis of mass injection data will also reflect pump slip stability.

CVS System Verification:

The following technique can be used to verify that the CVS and analytical instruments can accurately measure a mass of gas that has been injected into the system.

1. Obtain a small cylinder that has been charged with pure propane or carbon monoxide gas (caution—carbon monoxide is poisonous!). Critical flow orifice devices can also be used for constant flow metering.

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2. Determine a reference cylinder weight to the nearest 0.01 gram.

3. Operate the CVS in the normal manner and release a quantity of pure propane or carbon monoxide into the system during the sampling period.

4. The calculations of § 86.177-22 are performed in a normal way except, in the case of propane, the density of propane (17.30 grams/cu./ft./carbon atom) is used in place of the density of exhaust hydrocarbons. In the case of carbon monoxide, the density of 32.97 grams/cu. ft. is used.

5. The gravimetric mass is subtracted from the CVS measured mass and then divided by the gravimetric mass to determine the percent accuracy of the system.

6. The cause for any discrepancy greater than ±2 percent should be found and corrected. The following list of parametric errors may assist the operator in locating the cause of large errors.

Positive Error (Indication is higher than true value):

1. Calculated V_o is greater than actual V_o.

a. Original calibration in error.

2. Pump inlet temperature recorder is reading low. A 6 F. discrepancy will give a 1 percent error.

3. Pump inlet pressure indicator is reading high. A 3.5 in. H_2O high reading will give 1 percent error.

4. Background concentration reading is too low. Check analyzer zero. Check leakage at floor inlet.

5. Analyzer is reading high. Check span.

6. Barometer reading is in error (too high). Barometric pressure reading should be gravity and temperature corrected.

7. Revolution counter is reading high (Check pump speed and counters.)

8. Mixture is stratified causing the sample to be higher than the average concentration in the mixture. Negative Error (Indication is lower than true value):

1. Calculated V_o is less than actual V_o.

a. Original calibration in error.

b. Pump clearances decreased due to influx of some surface adherent material. Recalibration may be needed.

2. Pump inlet temperature recorder is reading high.

3. Pump inlet pressure indicator is reading low.

4. Background concentration reading is too high.

5. Analyzer is reading low.

6. Barometer reading is in error (too low).

7. Revolution counter is reading low.

8. There is a leak into the sampling system. Pressure check the lines and fittings on the intake side of sample transfer pumps on both the CVS and analyzer console.

[42 FR 33000, June 28, 1977]

Appendix IV—Durability Driving Schedules

(a) Durability Driving Schedule for Light-Duty Vehicles and Light-Duty Trucks.

The schedule consists basically of 11 laps of a 3.7 mile course. The basic vehicle speed for each lap is listed below:

Lap	Speed miles per hour
1	40
2	30
3	40
4	40
5	35
6	30
7	35
8	45
9	35
10	55
11	70

During each of the first nine laps there are 4 stops with 15 second idle. Normal accelerations and decelerations are used. In addition, there are 5 light decelerations each lap from the base speed to 20 m.p.h. followed by light accelerations to the base speed.

The 10th lap is run at a constant speed of 55 m.p.h.

The 11th lap is begun with a wide open throttle acceleration from stop to 70 m.p.h. A normal deceleration to idle followed by a second wide open throttle acceleration occurs at the midpoint of the lap.

(b) Durability Driving Schedule for Motorcycles. The Durability Driving Schedule for Class III Motorcycles may be used for Light-Duty Vehicles and Light-Duty Trucks.

The schedule consists basically of 11 laps of a 6.0 km (3.7 mi) course. The basic vehicle speed for each lap is listed below:

SPEED (kilometers per hour)

Lap	Class I	Class II	Class III
1	65	65	65
2	45	45	65
3	65	65	55
4	65	65	45
5	55	55	55
6	45	45	55
7	55	55	70
8	70	70	55
9	55	55	46
10	70	90	90
11	70	90	110

During each of the first nine laps there are 4 stops with 15 second idle. Normal accelerations and decelerations are used. In addition, there are 5 light decelerations

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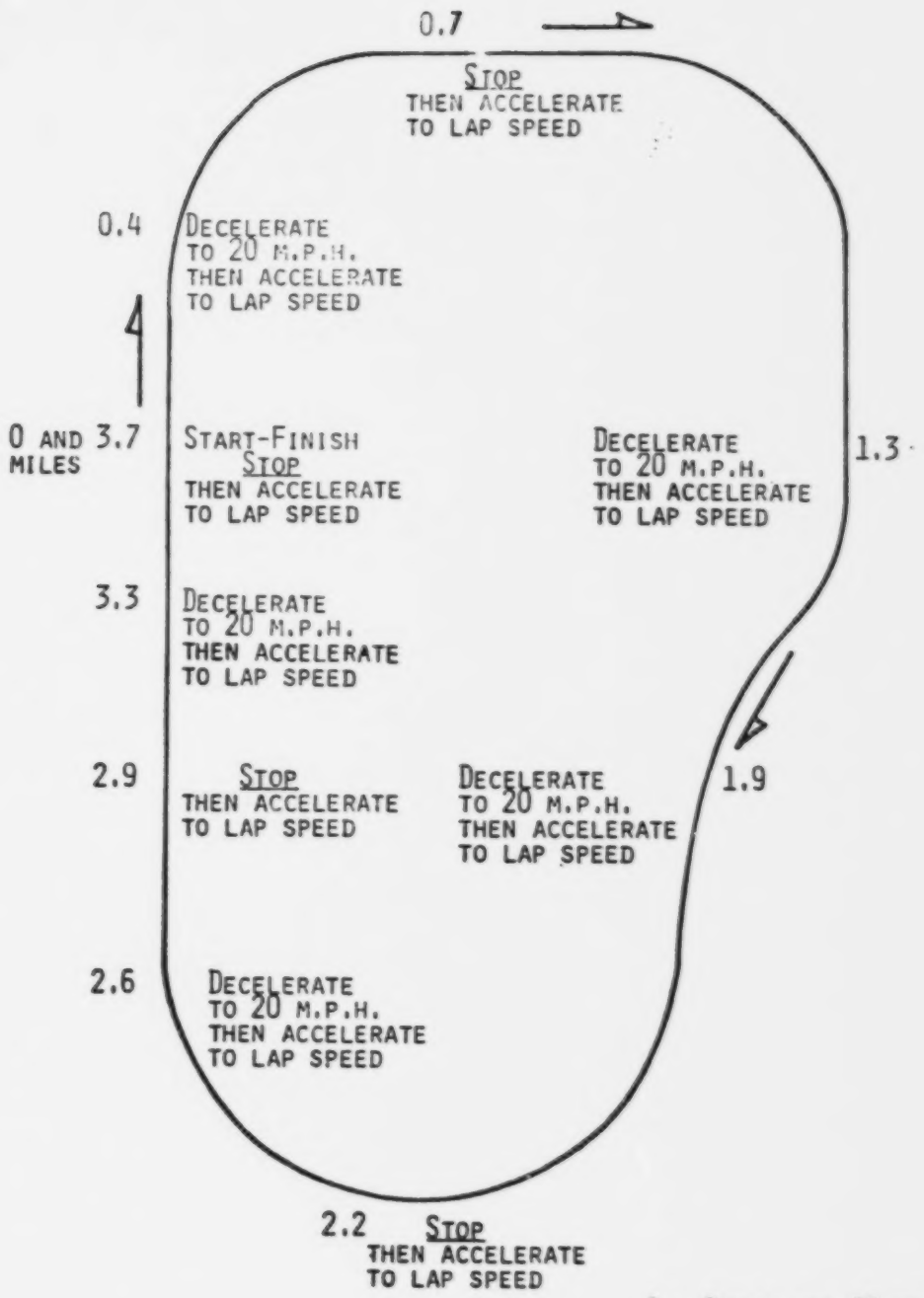
each lap from the base speed to 30 km/h followed by light accelerations to the base speed.

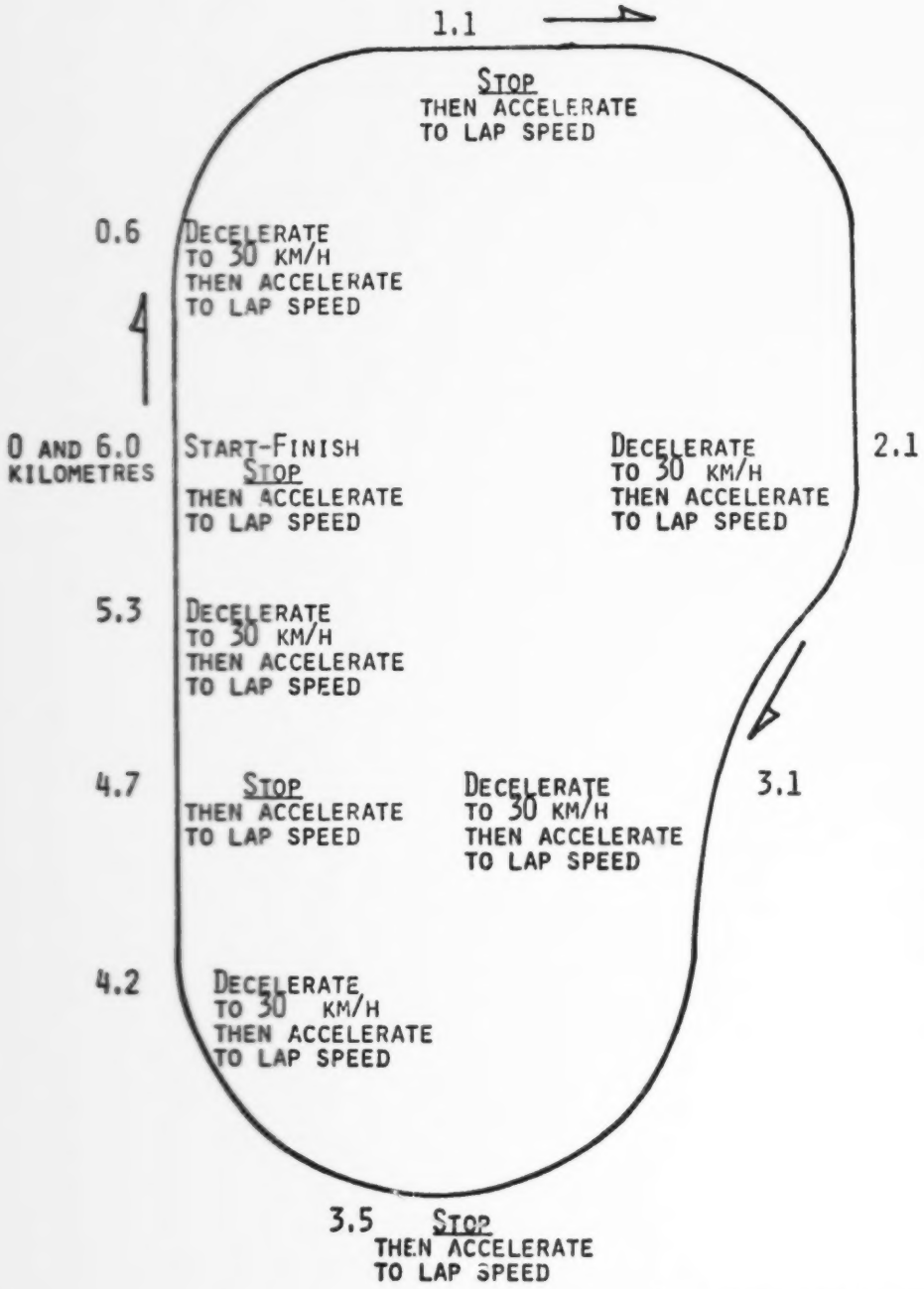
The 10th lap is run at a constant speed.

The 11th lap is begun with a wide open throttle acceleration from stop. A normal deceleration to idle followed by a second wide open throttle acceleration occurs at the midpoint of the lap.

This schedule may be modified with the advance approval of the Administrator if it results in unsafe operation of the vehicle.



ALL STOPS ARE 15 SECONDS



ALL STOPS ARE 15 SECONDS

[42 FR 33002, June 28, 1977]

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Appendix V—[Reserved]

Appendix VI—Vehicle and Engine Components

(a) Light-Duty Vehicles, Light-Duty Trucks, Motorcycles, and Gasoline-Fueled Heavy-Duty Engines.

I. Basic Mechanical Components-Engine.
(1) Intake and exhaust valves.
(2) Drive belts.
(3) Manifold and cylinder head bolts.
(4) Engine oil and filter.
(5) Engine coolant.
(6) Cooling system hoses and connections.
(7) Vacuum fittings, hoses, and connections.
(8) Oil injection metering system.

II. Fuel System.
(1) Fuel specification-octane rating, lead content.
(2) Carburetor-idle RPM, mixture ratio.
(3) Choke mechanism.
(4) Fuel system filter and fuel system lines and connections.
(5) Choke plate and linkage.

III. Ignition Components.
(1) Ignition timing and advance systems.
(2) Distributor breaker points and condenser.
(3) Spark plugs.
(4) Ignition wiring.
(5) Operating parts of distributor.

IV. Crankcase Ventilation System.
(1) PCV valve.
(2) Ventilation hoses.
(3) Oil filter breather cap.
(4) Manifold inlet (carburetor spacer, etc.).

V. External Exhaust Emission Control System.
(1) Secondary air injection system hoses.
(2) Air system manifolds
(3) Control valves and air pump.
(4) Manifold reactors.
(5) Catalytic converters.
(6) Exhaust recirculation.
(7) Water injection.

VI. Evaporative Emission Control System.
(1) Engine compartment hose connections.
(2) Carbon storage media.
(3) Fuel tank pressure-relief valve operation.
(4) Fuel vapor control valves.

VII. Air Inlet Components.
(1) Carburetor air cleaner filter.
(2) Hot air control valve.

(b) Diesel Light-Duty Vehicles, Diesel Light-Duty Trucks, and Diesel Heavy-Duty Engines.

I. Engine Mechanical Components.
(1) Valve train.
(2) Cooling system.
a. Coolant.
b. Thermostat.
c. Filter.
(3) Lubrication.
a. Oil filter.
b. Lubricant.

II. Fuel System.
(1) Fuel type.
(2) Fuel pump.
(3) Fuel filters.
(4) Injectors.
(5) Governor.

III. Air Inlet Components.
(1) Air cleaner.
(2) Inlet ducting.

IV. External Exhaust Emission Control System.
(1) Rack limiting devices (aneroid, throttle delay, etc.).
(2) Manifold reactors.
(3) Catalytic converters.
(4) Exhaust recirculation.
(5) Water injection.

[42 FR 33004, June 28, 1977]

Appendix VII—[Reserved]

Appendix VIII—Sampling Plans for Selective Enforcement Auditing

Table I—Sample Size Code Letters

Batch size	Code letter
4 to 8	A
9 to 15	B
16 to 25	C
26 and larger	D

Table II—Sampling Plans for Inspecting Batches (40% AQL)

Sample size code letter	Text sample	Test sample size	Cumulative test sample size	Batch inspection criteria	
				Acceptance No.	Rejection No.
A	1st	3	3	1	2
B	1st	4	4	2	3
C	1st	3	3	0	3

TABLE II—SAMPLING PLANS FOR INSPECTING BATCHES (40% AQL)—Continued

Sample size code letter	Text sample	Test sample size	Cumulative test sample size	Batch inspection criteria: Acceptance No.	Batch inspection criteria: Rejection No.
	d	3	6	3	4
D	1st	2	2	0	(1)
	2d	2	4	2	4
	3d	2	6	3	4

(1) Batch rejection not permitted at this sample size.

TABLE III—BATCH SEQUENCE PLANS (40% AQL)

Sample size code letter	Number of batches	Cumulative number of batches	Sequence inspection criteria: Acceptance No.	Sequence inspection criteria: Rejection No.
A	2	2	0	(1)
	2	4	2	4
	2	6	4	5
B	2	2	0	2
	2	4	1	3
	2	6	2	3
C	2	2	0	2
	2	4	1	3
	2	6	2	4
	2	8	3	4
D	2	2	(2)	2
	2	4	0	3
	2	6	1	3
	2	8	2	4
	2	10	3	4

(1) Batch sequence rejection not permitted for this number of batches.
(2) Batch sequence acceptance not permitted for this number of batches.

[41 FR 31491, July 28, 1976]

APPENDIX IX—SELECTIVE ENFORCEMENT AUDITING TEST PROCEDURES FOR 1977 MODEL YEAR LIGHT-DUTY VEHICLES AND LIGHT-DUTY TRUCKS

NOTE: Appendix IX to Part 86 does not apply to the 1980 model year and subsequent model years.

This appendix describes the test procedures which shall be used to determine conformity of test vehicles with the requirements of Subpart G of 40 CFR Part 86.

I. *Test procedures.* Vehicles shall be tested for conformity with following procedures:

(1) *Gasoline-fueled vehicles.* (i) The test consists of prescribed sequences of fueling, parking, and operating conditions. The exhaust gases generated during vehicle operation are diluted with air and sampled continuously for subsequent analysis of specific components by prescribed analytical techniques. The test applies to vehicles equipped with catalytic or direct-flame afterburners, induction system modifications, or other systems or to uncontrolled vehicles and engines.

(ii) The exhaust emission test is designed to determine hydrocarbon, carbon monoxide, and oxides of nitrogen mass emissions while simulating an average trip of 7.5 miles in an urban area. The test consists of engine startups and vehicle operation on a chassis dynamometer through a specified driving schedule, as described in Appendix I to 40 CFR Part 86. A proportional part of the diluted exhaust emissions is collected continuously, for subsequent analysis, using a constant volume (variable dilution) sampler.

(iii) Except in cases of component malfunction or failure, all emission control systems installed on or incorporated in a new motor vehicle shall be functioning during all procedures in this appendix.

(2) *Diesel vehicles.* (i) The test consists of prescribed sequences of fueling, parking, and operating conditions. The exhaust gases generated during vehicle operation are diluted with air and sampled continuously for

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analysis of Diesel exhaust hydrocarbons and subsequent analysis of other specific components by prescribed techniques. The test applies to vehicles equipped with catalytic or direct flame afterburners, other control systems or to uncontrolled vehicles and engines. All test phases are conducted within an ambient temperature range of 68° to 86° F.

(ii) The exhaust emission test is designed to determine hydrocarbon, carbon monoxide, and oxides of nitrogen mass emissions while simulating an average trip of 7.5 miles in an urban area. The test consists of engine startups and vehicle operation on a chassis dynamometer through a specified driving schedule, as described in Appendix I to 40 CFR Part 86. Using a constant volume (variable dilution) sampler, a proportional part of the diluted exhaust gas is analyzed continuously for hydrocarbons and an additional proportional part of the diluted exhaust gas is collected in bags for subsequent analysis of the other components.

(iii) Except for component malfunction or failure, all emission control systems installed on or incorporated in a new motor vehicle shall be functioning during all procedures in this subpart.

II. *Fuel specifications*—(a) *Gasoline.* (1) Gasoline having the following specifications will be used by the Administrator in exhaust emission testing.

Gasoline having the following specifications or substantially equivalent specifications approved by the Administrator, shall be used by the manufacturer in testing.

(2) Gasoline representative of commercial gasoline which will be generally available through retail outlets shall be used in mileage accumulation. For unleaded gasoline the minimum lead content shall be 0.02 grams per U.S. gallon and the minimum phosphorus content shall be 0.002 grams per U.S. gallon. For leaded gasoline, the minimum lead content shall be 1.4 grams per U.S. gallon, except that where the Administrator determines that vehicles represented by a test vehicle will be operated using gasoline of different lead content than that prescribed in this paragraph, he may consent in writing to use of a gasoline with a different lead content. The octane rating of the gasoline used shall be no higher than 4.0 research octane numbers above the minimum recommended by the manufacturer. The Reid Vapor Pressure of the gasoline used shall be characteristic of the motor fuel during the season which the mileage accumulation takes place.

(3) The specification range of the gasoline used under paragraph (a)(2) of this subdivision shall be recorded.

(b) *Diesel fuel.* (1) The diesel fuels employed for testing shall be clean and bright, with pour and cloud points adequate for operability. The diesel fuel may contain nonmetallic additives as follows: Cetane improver, metal deactivator, antioxidant, dehazer, antitrust, pour depressant, dye, and dispersant.

(2) Diesel fuel meeting the following specifications, or substantially equivalent specifications approved by the Administrator, shall be used in exhaust emissions testing: The grade of diesel fuel recommended by the engine manufacturer commercially designated as "Type 1-D" or "Type 2-D", shall be used.

(3) Other petroleum distillation fuel specifications:

(i) Other petroleum distillate fuels may be used for testing and service accumulation provided they are commercially available, and

(ii) Information, acceptable to the Administrator, is provided to show that only the designated fuel would be used in customer service, and

(iii) Use of a fuel listed under paragraphs (b)(1) and (b)(2) of this subdivision would have a detrimental effect on emissions or durability, and

(iv) Written approval from the Administrator of the fuel specifications was provided prior to the start of testing.

(4) The specification range of the fuels used under paragraphs (b)(1), (b)(2), and (b)(3) of this subdivision shall be recorded.

Item designation	ASTM	Leaded	Unleaded
Octane, research, minimum	D1656	100	96
Pb (organic), grams/U.S. gallon		1.14	0.00–0.05
Distillation range			
IBP, °F	D86	75-95	75–95
10 percent point, °F	D86	120–135	120–135
50 percent point, °F	D86	200–230	200–230
90 percent point, °F	D86	300–325	300–325
EP, °F (maximum)	D86	415	415
Sulphur, weight percent, maximum	D1266	0.10	.10
Phosphorus, grams/U.S. gallon, maximum		.01	.005
RVP, pounds	D323	8.0–9.2	8.0–9.2
Hydrocarbon composition			
Olefins, percent, maximum	D1319	10	10
Aromatics, percent, maximum	D1319	35	35

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Item designation	ASTM	Leaded	Unleaded
Saturates	D1319	(1)	(1)

For testing at altitudes above 1,219 meters (4,000) the specified range is 75-105
For testing at altitudes above 1,219 meters (4,000 feet) the specified range is 7.9-9.2
Remainder

III. *Gasoline-fueled vehicle preparation.* Gasoline-fueled vehicles to be tested in accordance with this appendix shall be prepared as follows:

(1)(i) Inspect the fuel system carefully to insure the absence of any leaks to the atmosphere of either liquid or vapor which might affect the accuracy of the test or the performance of the control system. Such inspection shall include the application of a pressure of 14.5 inches of water (plus or minus 0.5 inches of water) to the fuel system. The pressure should be applied and allowed to stabilize and the fuel system isolated from the pressure source. The fuel system may not lose more than 2.0 inches of water in five minutes beginning with the isolation of the fuel system. Corrective action, if required, shall be performed in accordance with § 86.608(e) and be reported with the final test report under § 86.609(e).

(ii) Care should be exercised, in the application of any pressure tests, neither to purge nor load the evaporative emission control system.

IV. *Vehicle preconditioning.* (a) Gasoline-fueled vehicles to be tested in accordance with this appendix shall be preconditioned as follows:

(1)(i) The fuel tank(s) shall be drained and filled with the specified test fuel (II.(a)(1)) to 40 percent of nominal capacity, rounded to the nearest whole U.S. gallon; or,

(ii) The fuel line from the tank(s) shall be clamped and disconnected from the fuel pump. A line from a "slave" tank, filled with specified test fuel, shall be connected to the fuel pump. If the fuel pump is equipped with a fuel return line, it shall be disconnected from the vehicle tank(s) and connected to the "slave" tank. The "slave" tank shall deliver fuel to the fuel pump at approximately neutral pressure. The vehicle fuel tank(s) shall be filled with either test fuel or fuel used during mileage accumulation to 40 percent of nominal capacity, rounded to the nearest whole U.S. gallon. Except as modified by this section, all connections within the evaporative emissions control system shall remain intact.

(2) The fuel added to the vehicle tank(s) or in the "slave" tank shall have an initial temperature of no more than 86 F. The evaporative emission control system or device shall not be abnormally purged or loaded as a result of draining or filling the tank(s) or connecting the "slave" tank.

(3) The test vehicle shall be placed on the dynamometer and operated over a simulated trip, according to the requirements of Sections V through XIII of this appendix. The engine need not be cold when starting the run on the dynamometer and a single trip of 7.5 miles shall be made. Longer preconditioning may be permitted with advance approval of the Administrator. The test vehicle shall not be used to set dynamometer horsepower. During this operation the ambient temperature shall be between 68° F and 86° F.

(4) The engine and cooling fan shall be stopped upon completion of the dynamometer operation and the vehicle permitted to soak either on or off the dynamometer stand at an ambient temperature between 76° F and 86° F for a period of not less than one hour.

(5) The test vehicle shall then be allowed to soak in an area where the ambient temperature is maintained between 60° F and 86° F for a period of not less than 11 (eleven) hours prior to the dynamometer operation prescribed in sections V through XIII of this appendix.

(b) Diesel vehicles to be tested in accordance with this appendix shall be preconditioned as follows:

(1)(i) The fuel tank(s) of each test vehicle shall be filled with specified test fuel (II.(b)(1)) to 40 percent of nominal capacity, rounded to the nearest whole U.S. gallon; or,

(ii) The fuel line from the tank(s) shall be clamped and disconnected from the fuel pump. A line from a "slave" tank, filled with specified test fuel, shall be connected to the fuel pump. If the fuel pump is equipped with a fuel return line, it shall be disconnected from the vehicle tank(s) and connected to the "slave" tank. The "slave" tank shall deliver fuel to the fuel pump at approximately neutral pressure. The vehicle fuel tank(s) shall be filled with specified test fuel to 40 percent of nominal capacity, rounded to the nearest whole U.S. gallon.

(2) The test vehicle shall be placed on the dynamometer and operated over a simulated trip, according to the requirements of Sections V through XIII of this appendix. The engine need not be cold when starting the run on the dynamometer and a single trip of 7.5 miles shall be made. The test vehicle shall not be used to set dynamometer horsepower.

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(3) The engine and cooling fan shall be stopped upon completion of the dynamometer operation and the vehicle permitted to soak either on or off the dynamometer stand for a period of not less than 12 hours prior to the dynamometer test.

V. *Dynamometer driving schedule.* (a) The dynamometer driving schedule to be followed consists of a nonrepetitive series of idle, acceleration, cruise, and deceleration modes of various time sequences and rates. The driving schedule is defined by a smooth transition through the speed vs. time relationships listed in Appendix I of 40 CFR Part 86. The time sequence begins upon starting the vehicle according to the startup procedure described in Section X of this appendix.

(b) The speed tolerance at any given time on the dynamometer driving schedule prescribed in Appendix I or as plotted on a driver's aid chart approved by the Administrator, when conducted to meet the requirements of Section VI of this appendix, is defined by upper and lower limits. The upper limit is 2 m.p.h. higher than the highest point on the trace within 1 second of the given time. The lower limit is 2 m.p.h. lower than the lowest point on the trace within 1 second of the given time. Speed variations greater than the tolerances (such as occur when shifting manual transmission vehicles) are acceptable provided they occur for less than 2 seconds on any one occasion. Speeds lower than those prescribed are acceptable provided the vehicle is operated at maximum available power during such occurrences. Further, speed deviations from those prescribed due to stalling are acceptable provided the provisions of Section X(d) are adhered to. When conducted to meet the requirements of Section IV, the speed tolerance shall be as specified above, except that the upper and lower limits shall be 4 m.p.h.

VI. *Dynamometer procedure.* (a) The dynamometer run consists of two tests, a "cold" start test after a minimum 12-hour soak (according to the provisions of Section IV of this appendix) and a "hot" start test with a 10-minute soak between the two tests. Engine startup (with all accessories turned off), operation over the driving schedule, and engine shutdown make a complete cold start test. Engine startup and operation over the first 505 seconds of the driving schedule complete the hot start test. The exhaust emissions are diluted with air to a constant volume and a portion is sampled continuously during each test. (Diesel hydrocarbons are analyzed continuously.) The composite (flow integrated) samples collected in bags are analyzed for hydrocarbons (except Diesel), carbon monoxide, carbon dioxide, and oxides of nitrogen. A parallel sample of the dilution air is similarly analyzed for hydrocarbon, carbon monoxide, and oxides of nitrogen.

(b) During dynamometer operation, a fixed speed cooling fan shall be positioned so as to direct cooling air to the vehicle in an appropriate manner with the engine compartment cover open. The fan capacity shall normally not exceed 5,300 c.f.m. If, however, the manufacturer can show that during field operation the vehicle receives additional cooling, the fan capacity may be increased or additional fans used if approved in advance by the Administrator. In the case of vehicles with front engine compartments, the fan(s) shall be squarely positioned between 8 and 12 inches in front of the cooling air inlets (grill). In the case of vehicles with rear engine compartments (or if special designs make the above impractical), the cooling fan(s) shall be placed in a position to provide sufficient air to maintain engine cooling.

(c) The vehicle shall be nearly level when tested in order to prevent abnormal fuel distribution.

(d) Flywheels, electrical or other means of simulating inertia as shown in the following table shall be used. If the equivalent inertia specified is not available on the dynamometer being used, the next higher equivalent inertia (not to exceed 250 lbs.) available shall be used.

(e) Power absorption unit adjustment.

(1) The power absorption unit shall be adjusted to reproduce road load power at 50 m.p.h. true speed. The indicated road load power setting shall take into account the dynamometer friction. The relationship between road load (absorbed) power and indicated road load power for a particular dynamometer shall be determined by the procedure outlined in Appendix II of 40 CFR Part 86 or other suitable means.

Loaded vehicle weight, pounds	Equivalent inertia weight, pounds	Road load power at 50 m.p.h. horsepower
Up to 1,125	1,000	5.9
1,126 to 1,375	1,250	6.5
1,376 to 1,625	1,500	7.1
1,626 to 1,875	1,750	7.7
1,876 to 2,125	2,000	8.3
2,126 to 2,375	2,250	8.8
2,376 to 2,625	2,500	9.4
2,626 to 2,875	2,750	9.9
2,876 to 3,250	3,000	10.3
3,251 to 3,750	3,500	11.2
3,751 to 4,250	4,000	12.0
4,251 to 4,750	4,500	12.7
4,751 to 5,250	5,000	13.4
5,251 to 5,750	5,500	13.9
5,751 to above	5,500	14.4

(2) The road load power listed in the table above shall be used or the vehicle manufac-

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turer may determine the road load power by an alternate procedure requested by the manufacturer and approved in advance by the Administrator, or the vehicle manufacturer may determine the road load power by the following procedure and request its use:

(i) *Gasoline-fuel vehicles.* (A) Measuring the absolute manifold pressure of a representative vehicle, of the same equivalent inertia weight class, when operated on a level road under balanced wind conditions at a true speed of 50 m.p.h., and

(B) Noting the dynamometer indicated road load horsepower setting required to reproduce that manifold pressure when the same vehicle is operated on the dynamometer at a true speed of 50 m.p.h. The tests on the road and on the dynamometer shall be performed with the same vehicle ambient absolute (usually barometric), i.e., within ±5 mm. Hg.

(ii) *Diesel vehicles.* (A) Measuring the fuel flow rate of a representative vehicle of the same equivalent inertia weight class, when operated on a level road under balanced wind conditions at a true speed of 50 m.p.h., and

(B) Noting the dynamometer indicated road load horsepower setting required to reproduce that fuel flow rate when the same vehicle is operated on the dynamometer at a true speed of 50 m.p.h. The tests on the road and on the dynamometer shall be performed with the same vehicle ambient absolute pressure (usually barometric), i.e. within ±5 mm. Hg.

(3) The road load power shall be adjusted according to the following if applicable:

(i) Where it is expected that more than 33 percent of the vehicles in an engine family will be equipped with air conditioning, the road load power listed above or as determined in paragraph (e)(2) of this subdivision shall be increased by 10 percent for testing all test vehicles representing such engine family if those vehicles are intended to be offered with air conditioning in production.

(f) The vehicle speed (m.p.h.) as measured from the dynamometer rolls shall be used for all conditions. A speed vs. time recording, as evidence of dynamometer test validity, shall be supplied on request of the Administrator.

(g) Practice runs over the prescribed driving schedule may be performed at test points, provided an emission sample is not taken, for the purpose of finding the minimum accelerator pedal action to maintain the proper speed-time relationship, or to permit sampling system adjustments to comply with Section XI(a)(2)(ii) or Section XI(b)(2)(ii).

NOTE: When using two-roll dynamometers a truer speed-time trace may be obtained by minimizing the rocking of the vehicle in the rolls. The rocking of the vehicle changes the tire rolling radius on each roll. The rocking may be minimized by restraining the vehicle horizontally (or nearly so) by using a cable and winch.

(h) The drive wheel tires may be inflated up to 45 p.s.i.g. in order to prevent tire damage. Slave tires may be substituted for the drive wheel tires with which the vehicle is equipped provided they are the same size. The drive wheel tire pressure shall be recorded.

(i) If the dynamometer has not been operated during the 2-hour period immediately preceding the test it shall be warmed up for 15 minutes by operating it at 30 m.p.h. using a nontest vehicle.

(j) If the dynamometer horsepower must be adjusted manually, it shall be set within 1 hour prior to the exhaust emissions test. The test vehicle shall not be used to make this adjustment. Dynamometers using automatic control of preselectable power settings may be set anytime prior to the beginning of the test.

VII. *Three-speed manual transmissions.* (a) All test conditions except as noted shall be run in highest gear.

(b) Cars equipped with free wheeling or overdrive units shall be tested with this unit (free wheeling or overdrive) locked out of operation.

(c) Idle shall be run with transmission in gear and with clutch disengaged (except first idle; see Section X).

(d) The vehicle shall be driven with minimum accelerator pedal movement to maintain the desired speed.

(e) Acceleration modes shall be driven smoothly with the shift speeds as recommended by the manufacturer. If the manufacturer does not recommend shift speeds, the vehicle shall be shifted from first to second gear at 15 m.p.h. and from second to third gear at 25 m.p.h. The operator shall release the accelerator pedal during the shift, and accomplish the shift with minimum closed throttle time. If the vehicle cannot accelerate at the specified rates, the vehicle shall be operated with accelerator pedal fully depressed until the vehicle speed reaches the speed at which it should be at that time during the test.

(f) The deceleration modes shall be run with clutch engaged and without shifting gears from the previous mode, using brakes or accelerator pedal as necessary to maintain the desired speed. For those modes which decelerate to zero, the clutch shall be depressed when the speed drops below 15 m.p.h., when engine roughness is evident, or when engine stalling is imminent.

(g) Downshifting is allowed at the beginning of or during a power mode if recommended by the manufacturer or if the engine obviously is lugging.

VIII. Four-speed and five-speed manual transmissions. (a) Use the same procedure as for three-speed manual transmissions for shifting from first to second gear and from second to third gear. If the manufacturer does not recommend shift speeds, the vehicle shall be shifted from third to fourth gear at 40 m.p.h. Fifth gear may be used at the manufacturer's option.

(b) If transmission ratio in first gear exceeds 5:1, follow the procedure for three-or four-speed manual transmission vehicles as if the first gear did not exist.

IX. *Automatic transmissions.* (a) All test conditions shall be run with the transmission in "Drive" (highest gear). Automatic stick-shift transmissions may be shifted as manual transmissions at the option of the manufacturer.

(b) Idle modes shall be run with the transmission in "Drive" and the wheels braked (except first idle; see Section X).

(c) The vehicle shall be driven with minimum accelerator pedal movement to maintain the desired speed.

(d) Acceleration modes shall be driven smoothly allowing the transmission to shift automatically through the normal sequence of gears. If the vehicle cannot accelerate at the specified rates, the vehicle shall be operated with accelerator pedal fully depressed until the vehicle speed reaches the speed at which it should be at that time during the driving schedule.

(e) The deceleration modes shall be run in gear using brakes or accelerator pedal as necessary to maintain the desired speed.

X. *Engine starting and restarting*—(a) *Gasoline-fueled vehicles.* (1) The engine shall be started according to the manufacturer's recommended starting procedures. The initial 20-second idle period shall begin when the engine starts.

(2) *Choke operation.* (i) Vehicles equipped with automatic chokes shall be operated according to the instructions which will be included in the manufacturer's operating instructions or owner's manual including choke setting and "kick-down" from cold fast idle. The transmission shall be placed in gear 15 seconds after the engine is started. If necessary, braking may be employed to keep the drive wheels from turning.

(ii) Vehicles equipped with manual chokes shall be operated according to the manufacturer's operating instructions or owner's manual.

(3) The operator may use the choke, accelerator pedal, etc. where necessary to keep the engine running.

(4) If the manufacturer's operating or owner's manual does not specify a warm engine starting procedure, the engine (automatic and manual choke engines) shall be started by depressing the accelerator pedal about half way and cranking the engine until it starts.

(b) *Diesel vehicles.* (1) The engine shall be started according to the manufacturer's recommended starting procedures. The initial 20-second idle period shall begin when the engine starts. The transmission shall be placed in gear 15 seconds after the engine is started. If necessary, braking may be employed to keep the drive wheels from turning.

(c) If the vehicle does not start after 10 seconds of cranking, cranking shall cease and the reason for failure to start shall be determined. The revolution counter on the constant volume sampler (and the hydrocarbon integrator when testing Diesel vehicles, see Section XIII), shall be turned off and the sample solenoid valves placed in the "dump" position during this diagnostic period. In addition, either the positive displacement pump should be turned off or the exhaust tube disconnected from the tailpipe during the diagnostic period. If failure to start is an operational error, the vehicle shall be rescheduled for testing from a cold start. If failure to start is caused by vehicle malfunction, corrective action of less than 30 minutes duration may be taken and the test continued. The sampling system shall be reactivated at the same time cranking is started. When the engine starts, the driving schedule timing sequence shall begin. If failure to start is caused by vehicle malfunction and the vehicle cannot be started, the test shall be voided, corrective action taken, and the vehicle rescheduled for test. The reason for the malfunction (if determined) and the corrective action taken shall be reported.

(d) If the engine "false starts", the operator shall repeat the recommended starting procedure (such as resetting the choke, etc.)

(e) Stalling:

(1) If the engine stalls during an idle period, the engine shall be restarted immediately and the test continued. If the engine cannot be started soon enough to allow the vehicle to follow the next acceleration as prescribed, the driving schedule indicator shall be stopped. When the vehicle restarts the driving schedule indicator shall be reactivated.

(2) If the engine stalls during some operating mode other than idle, the driving schedule indicator shall be stopped, the vehicle restarted, accelerated to the speed required at that point in the driving schedule and the test continued.

(3) If the vehicle will not restart within 1 minute, the test shall be voided, corrective action taken, and the vehicle rescheduled for test. The reason for the malfunction (if determined) and the corrective action taken shall be reported.

XI. *Sampling and analytical system (exhaust emissions)*—(a) *Gasoline-fueled vehicles.* The sampling and analytical systems for gasoline-fueled vehicles shall comply with paragraph (a) of this subdivision:

(1) *Schematic drawings.* The following figures (Figs. 1 and 2) are schematic drawings of the exhaust gas sampling and analytical systems which will be used for testing under the regulations in this part. Since various configurations of the required components can produce accurate results, these schematic drawings are not to be interpreted literally and exact conformance is not mandatory. Additional components such as instruments, valves, solenoids, pumps, and switches may be used to provide additional information and coordinate the functions of the component systems. (2) *Component description (exhaust gas sampling system).* The following components will be used in the exhaust gas sampling systems for testing under the regulations in this subpart. See figure 1. Other types of constant volume samplers may be used if shown to yield equivalent results and if approved in advance by the Administrator.

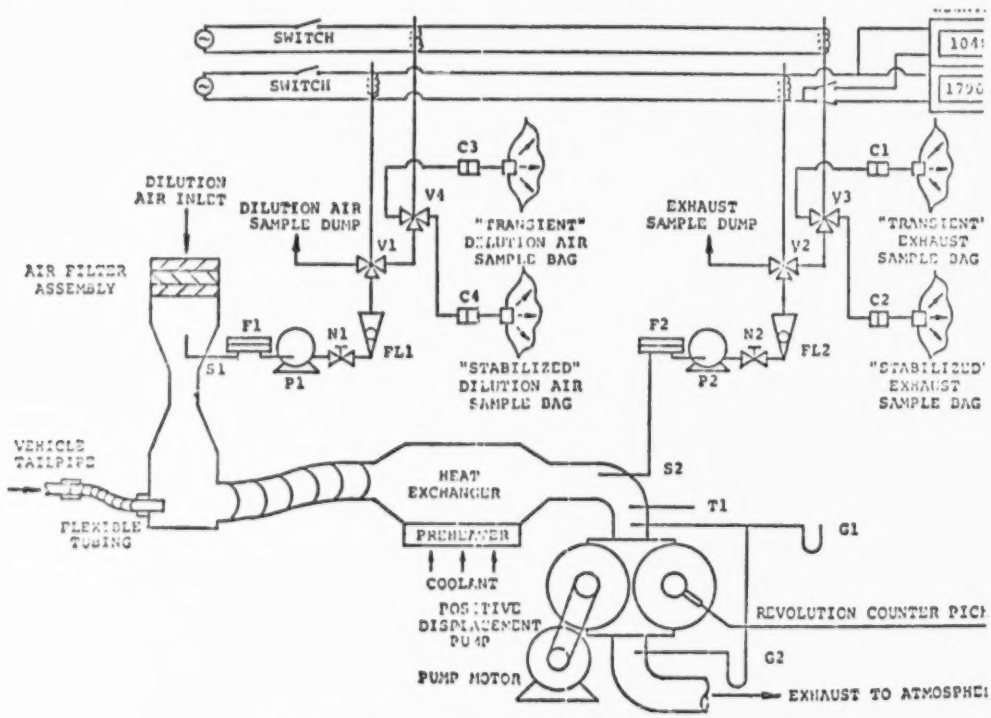

Figure 1 — Exhaust Gas Sampling System

(i) A dilution air filter assembly consisting of a particulate (paper) filter to remove solid matter from the dilution air and thus increase the life of the charcoal filter; a charcoal filter to reduce and stabilize the background hydrocarbon level; and a second particulate filter to remove charcoal particles from the air stream.

(ii) A leak-tight connector and tube to the vehicle tailpipe. The tubing shall be sized and connected in such a manner that the static pressure variations in the vehicle tailpipe(s) remain within ±5 inches of water of the static pressure variations measured during a dynamometer driving cycle with no connection to the tailpipe(s). Sampling systems capable of tolerances of ±1 inch of water will be used by the Administrator if a written request by the manufacturer substantiates the need for this closer tolerance.

(iii) A heating system to preheat exchanger to within ±10° F of its operating temperature before the test begins.

(iv) A heat exchanger capable of limiting the gas mixture temperature variation during the entire test to ±10° F as measured at a point immediately ahead of the positive displacement pump.

(v) A positive displacement pump to pump the dilute exhaust mixture. The pump capacity (300 to 350 c.f.m. is sufficient for testing most vehicles) shall be large enough to virtually eliminate water condensation in the system. (See Appendix III of 40 CFR Part 86 for one flow calibration technique.) Other suitable caliberation techniques may be used if approved in advance by the Administrator.

(vi) Temperature sensor (T1) with an accuracy of ±2° F to allow continuous recording of the temperature of the dilute exhaust mixture entering the positive displacement pump.

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(vii) Gauge (G1) with an accuracy of ±3 mm. Hg to measure the pressure depression of the dilute exhaust mixture entering the positive displacement pump, relative to atmospheric pressure.

(viii) Gauge (G2) with an accuracy of ±3 mm. Hg to measure the pressure increase across the positive displacement pump.

(ix) Sample probes (S1 and S2) pointed upstream to collect samples from the dilution airstream and the dilute exhaust mixture.

(x) Filters (F1 and F2) to remove particulate matter from dilution air and dilute exhaust samples.

(xi) Pumps (P1 and P2) to pump the dilution air and dilute exhaust into their respective sample collection bags.

(xii) Flow control valves (N1 and N2) to regulate flows to sample collection bags, at constant flow rates. The minimum sample flow rate shall be 10 c.f.h.

(xiii) Flowmeters (FL1 and FL2) to insure, by visual observation, that constant flow rates are maintained throughout the test.

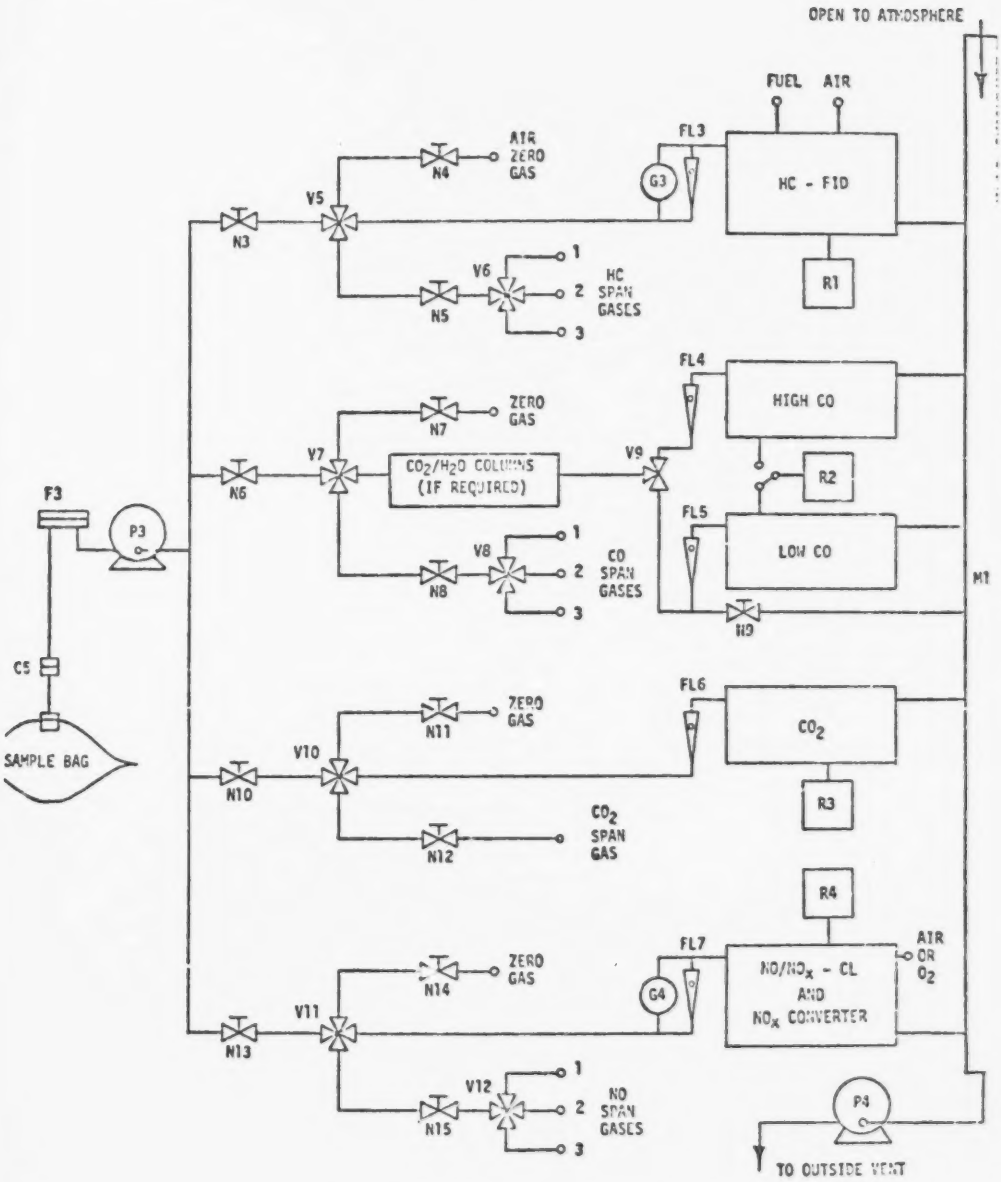

Figure 2 Exhaust Gas Analytical System

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(xiv) Three-ways solenoid valves (V1, V2, V3, and V4) to direct sample streams to either their respective bags or overboard.

(xv) Quick-connect, leak-tight fittings (C1, C2, C3, and C4) with automatic shutoff on bag side to attach sample bags to sample system.

(xvi) Sample collection bags for dilution air and exhaust samples of sufficient capacity so as not to impede sample flow.

(xvii) Revolution counters to count the revolutions of the positive displacement pump while each test phase is in progress and samples are being collected.

(3) Component description (exhaust gas analytical system). The following components will be used in the exhaust gas analtical system for testing under the regulations in this part. The analytical system provides for the determination of hydrocarbon concentrations

by flame ionization detector (FID) analysis, the determination of carbon monoxide and carbon dioxide concentrations by nondispersive infrared (NDIR) analysis and the determination of oxides of nitrogen concentrations by chemiluminescence (CL) analysis in dilute exhaust samples. The chemiluminescence method of analysis requires that the nitrogen dioxide present in the sample be converted to nitric oxide before analysis. (See Appendix V of 40 CFR Part 86.) Other types of analyzers may be used if shown to yield equivalent results and if approved in advance by the Administrator. (See Figure 2.)

(i) Quick-connect leak-tight fitting (C5) to attach sample bags to analytical system.

(ii) Filter (F3) to remove any residual particulate matter from the collected sample.

(iii) Pump (P3) to transfer samples from the sample bags to the analyzers.

(iv) Selector valves (V5, V6, V7, V8, V9, V10, V11, and V12) for directing samples, span gases or zeroing gases to the analyzers.

(v) Flow control valves (N3, N4, N5, N6, N7, N8, N9, N10, N11, N12, N13, N14, and N15) to regulate the gas flow rates.

(vi) Flowmeters (FL3, FL4, FL5, FL6, and FL7) to indicate gas flow rates.

(vii) Pressure gauges (G3 and G4) to facilitate greater precision in setting and reading flow rates.

(viii) Manifold (M1) to collect the expelled gases from the analyzers.

(ix) Pump (P4) to transfer expelled gases from the collection manifold to a vent external to the test room (optional).

(x) Analyzers to determine hydrocarbon, carbon monoxide, carbon dioxide and oxides of nitrogen concentrations. (See Section XII (a).)

(xi) Sample conditioning column containing $CaSO_4$ or indicating silica gel to remove water vapor and containing ascarite to remove carbon dioxide from the CO analysis stream.

NOTE: If CO instruments which are essentially free of CO_2 and water vapor interference are used, the use of the conditioning column may be deleted.

A CO instrument will be considered to be essentially free of CO_2 and water vapor interference if its response to a mixture of 3 percent CO_2 and N_2, which has been bubbled through water at room temperature (68°–86° F), produces an equivalent CO response, as measured on the most sensitive CO range, which is less than 1 percent of full scale CO concentration on instrument ranges above 300 ppm CO or less than 3 ppm on instrument ranges below 300 ppm CO.

(xii) Recorders (R1, R2, R3, and R4) or digital printers to provide permanent records of calibration, spanning and sample measurements; or in those facilities where computerized data acquisition systems are incorporated, the computer facility printout may be used.

(b) *Diesel vehicles*—(1) *Schematic drawings.* The following figures 3, 4, and 5 are schematic drawings of the exhaust gas sampling and analytical systems which will be used for testing under the regulations in this part. Since various configurations of the required components can produce accurate results, these schematic drawings are not to be interpreted literally and exact conformance is not mandatory. Additional components such as instruments, valves, solenoids, pumps, and switches may be used to provide additional information and coordinate the functions of the component systems.

(2) Component description (exhaust gas sampling system). The following components will be used in the exhaust gas sampling system for testing under the regulations in this part. (See Figure 3.) Other types of constant volume samplers may be used if shown to yield equivalent results, and if approved in advance by the Administrator.

(i) A dilution air filter assembly consisting of a particulate (paper) filter to remove solid matter from the dilution air and thus increase the life of the charcoal filter; a charcoal filter to reduce and stabilize the background hydrocarbon level; and a second particulate filter to remove charcoal particles from the air stream.

(ii) A leak-tight connector and tube to the vehicle tailpipe. The tubing shall be sized and connected in such a manner that the static pressure variations in the vehicle tailpipe(s) remain within ±5 inches of water of the static pressure variations measured during a dynamometer driving cycle with no connection to the tailpipe(s). Sampling systems capable of tolerances of ±1 inch of water will be used by the Administrator if a written request by the manufacturer substantiates the need for this closer tolerance.

(iii) A heating system to preheat the heat exchanger to within ±10 F of its operating temperature before the test begins.

(iv) A heat exchanger capable of limiting the gas mixture temperature variation during the entire test to ±10 F as measured at a point immediately ahead of the positive displacement pump.

(v) A positive displacement pump to pump dilute exhaust mixture. The pump capacity 300 to 350 c.f.m. is sufficient for testing most vehicles) shall be large enough to virtually eliminate water condensation in the system. See Appendix III to 40 CFR 86 for one flow calibration technique. Other suitable calibration techniques may be used if approved in advance by the Administrator.

(vi) Temperature sensor (T1) with an accuracy of ±2 F to allow continuous recording of the temperature of the dilute exhaust mixture entering positive displacement pump.

(vii) Gage (G1) with an accuracy of ±3mm. Hg to measure the pressure depression of the dilute exhaust mixture entering the positive displacement pump, relative to atmospheric pressure.

(viii) Gage (G2) with an accuracy of ±3mm. Hg to measure the pressure increase across the positive displacement pump.

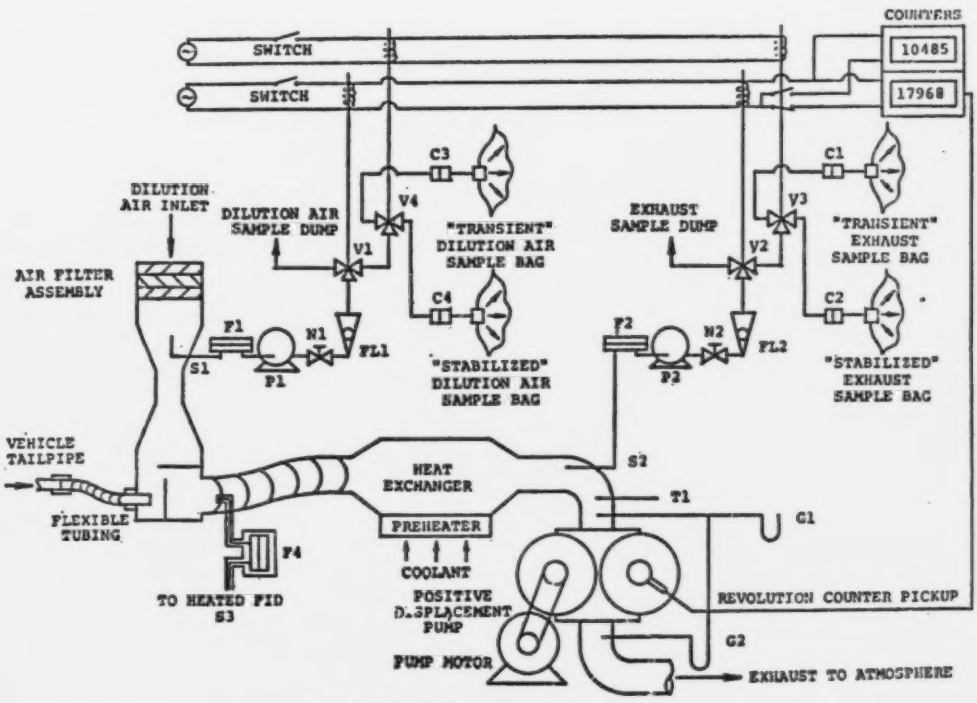

Figure B 77-3 Exhaust Gas Sampling System

(ix) Sample probes (S1, S2, and S3) pointed upstream to collect samples from the dilution air steam and the dilute exhaust mixture. Additional sample probes may be used, for example, to obtain continuous concentration traces of the dilute exhaust stream. In such case the sample flow rate, in standard cubic feet per test phase, must be added to the calculated dilute exhaust volume. The position of the sample probes in Figure 3 is pictorial only. The heated sample line (S3) between the sampling point and the analyzer shall be as short as possible.

(x) Filters (F1 and F2) to remove particulate matter from dilution air and dilute exhaust samples.

(xi) Pumps (P1 and P2) to pump the dilution air and dilute exhaust into their respective sample collection bags.

(xii) Flow control valves (N1 and N2) to regulate flows to sample collection bags, at constant flow rates. The minimum sample flow rate shall be 10 c.f.h.

(xiii) Flowmeters (FL1 and FL2) to insure, by visual observation, that constant flow rates are maintained throughout the test.

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(xiv) Three-way solenoid valves (V1, V2, V3, and V4) to direct sample streams to either their respective bags or overboard.

(xv) Quick-connect, leak-tight fittings (C1, C2, C3, and C4) with automatic shutoff on bag side to attach sample bags to sample system.

(xvi) Sample collection bags for dilution air and exhaust samples of sufficient capacity so as not to impede sample flow.

(xvii) Revolution counters to count the revolutions of the positive displacement pump while each test phase is in progress and samples are being collected.

(3) Component description (exhaust gas batch analytical system). The following components will be used in the exhaust gas batch analytical system for testing under the regulations in this part. The analytical system provides for the determination of carbon monoxide and carbon dioxide concentrations by nondispersive infrared (NDIR) analysis and the determination of oxides of nitrogen concentrations by chemiluminescence (CL) analysis in dilute exhaust samples. The chemiluminescence method of analysis requires that the nitrogen dioxide present in the sample be converted to nitric oxide before analysis. Other types of analyzers may be used if shown to yield equivalent results and if approved in advance by the Administrator. (See Figure 4.)

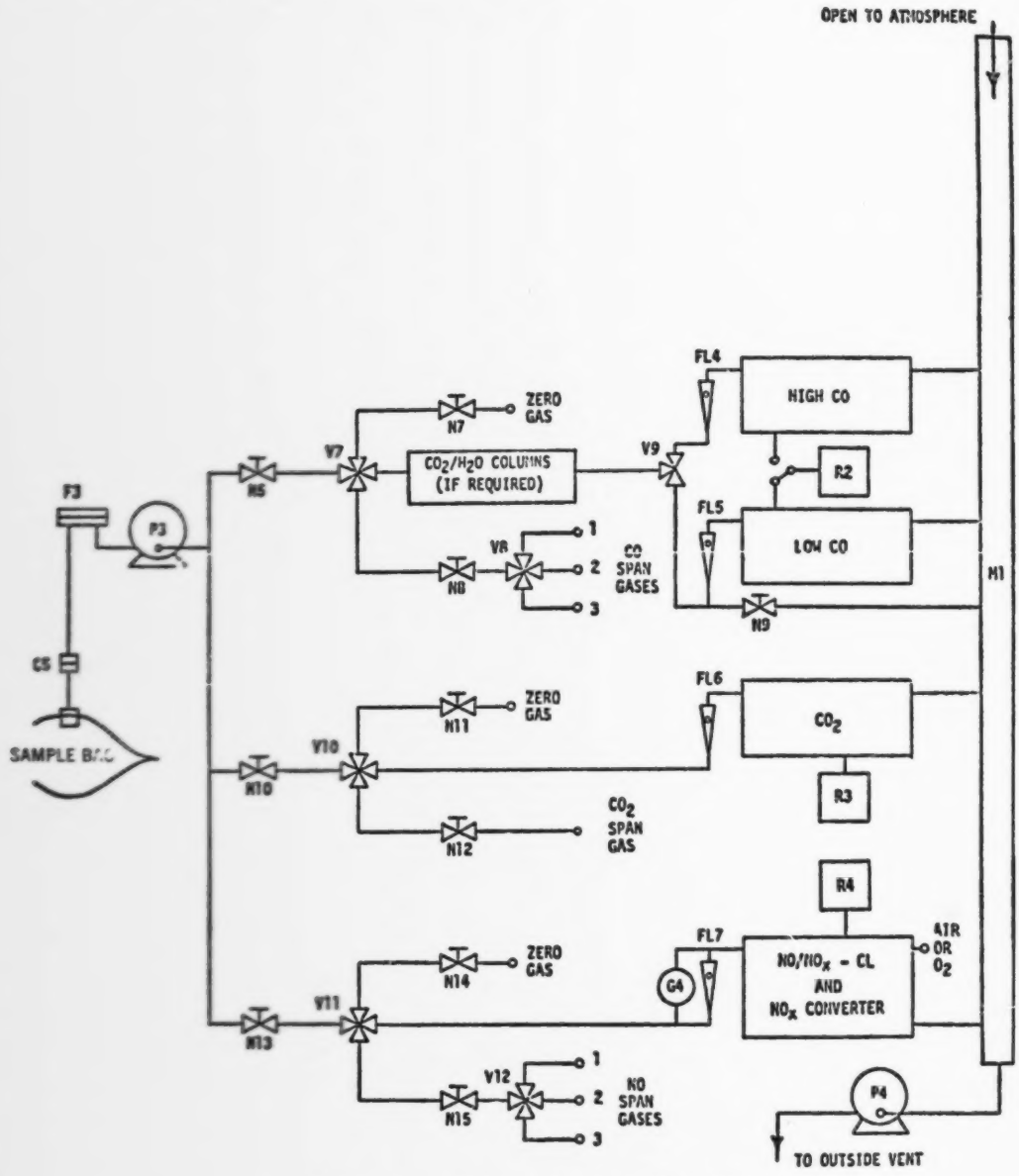

Figure 4 Exhaust Gas Analytical System

(i) Quick-connect, leak-tight fitting (C5) to attach sample bags to analytical system.

(ii) Filter (F3) to remove any residual particulate matter from the collected sample.

(iii) Pump (P3) to transfer samples from the sample bags to the analyzers.

(iv) Selector valves (V7, V8, V9, V10, V11, and V12) for directing samples, span gases or zeroing gases to the analyzers.

(v) Flow control valves (N6, N7, N8, N9, N10, N11, N12, N13, N14, and N15) to regulate the gas flow rates.

(vi) Flowmeters (FL4, FL5, FL6, and FL7) to indicate gas flow rates.

(vii) Pressure gauge (G4) to facilitate greater precision in setting and reading flow rate.

(viii) Manifold (M1) to collect the expelled gases from the analyzers.

(ix) Pump (P4) to transfer expelled gases from the collection manifold to a vent external to the testroom (optional).

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(x) Analyzers to determine carbon monoxide, carbon dioxide and oxides of nitrogen concentrations.

(xi) Sample conditioning column containing $CaSO_4$, or indicating silica gel to remove water vapor and containing ascraite to remove carbon dioxide from the CO analyses stream.

NOTE: If CO instruments which are essentially free of CO_2 and water vapor interference are used, the use of the conditioning column may be deleted.

A CO instrument will be considered to be essentially free of CO_2 and water vapor interference if its response to a mixture of 3 percent CO_2 in N_2, which has been bubbled through water at room temperature (68 -86° F), produces an equivalent CO response, as measured on the most sensitive CO range, which is less than 1 percent of full scale CO concentration on instrument ranges above 300 ppm CO or less than 3 ppm on instrument ranges below 300 ppm CO.

(xii) Recorders (R1, R2, and R3) or digital printers to provide permanent records of calibration, spanning and sample measurements; or in those facilities where computerized data acquisition systems are incorporated, the computer facility printout may be used.

(4) Component description (exhaust gas continuous analytical system). The following components will be used in the exhaust gas continuous analytical system for testing under the regulations in this part. This analytical system provides for the continuous determination of exhaust hydrocarbon concentration by heated flame ionization detector (HFID) analysis. Other types of analyzers may be used if shown to yield equivalent results and if approved in advance by the Administrator (See Figure 5.)

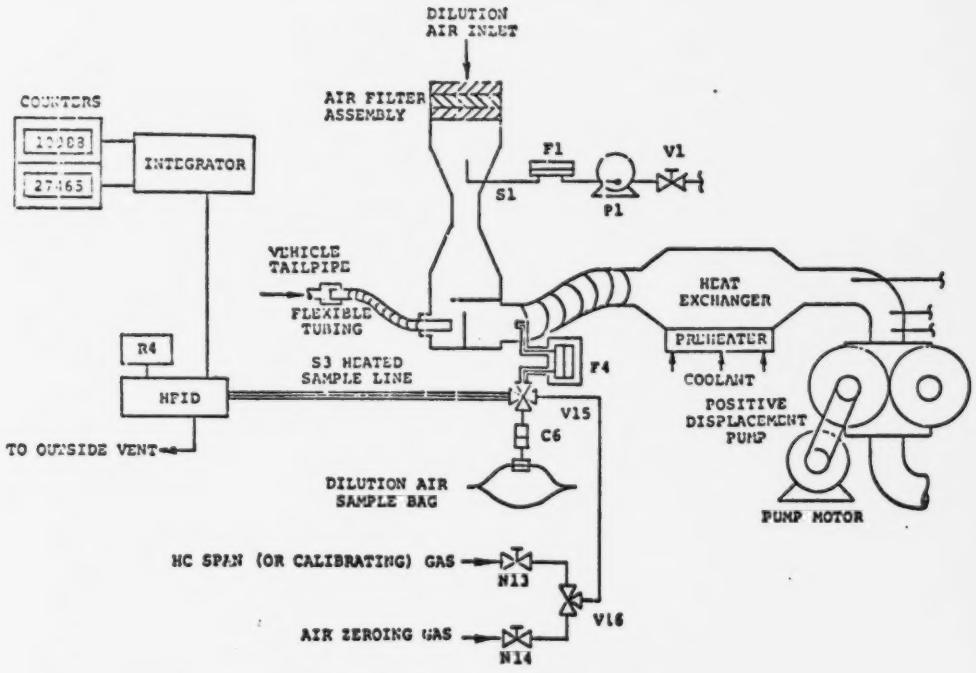

Figure 5 Diesel Hydrocarbon Continuous Analysis System

(i) Heated continuous sampling line (S3).

(ii) Heated filter (F4) to remove particulate matter from heated hydrocarbon sample.

(iii) Selector valves (V5 and V6) for directing the continuous dilute exhaust sample, dilution air bag sample, span or zeroing gases to the analyzers.

(iv) Quick-connect, leak-tight fitting (C6) to attach dilution air sample bag to analytical system.

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(v) Heated hydrocarbon analyzer (HFID) complete with heated pump, filter, and flow control system. The response time of this instrument shall be less than 1 second for 90 percent of full scale response. Sample transport time from sampling point to inlet of instrument shall be less than 4 seconds.

(vi) Chart recorder (R1) and analog integrator with two readouts, or chart recorder (R1) and on-line digital computer for manual or electronic integration of analyzer output signal during the three operating phases of the test.

(vii) Flow control valves (N4 and N5) to regulate the gas flow rates.

XII. *Analytical system calibration and sample handling.* (a) Calibrate the analytical assembly at least once every 30 days. Use the same flow rate as when analyzing samples.

(1) Adjust analyzers to optimize performance. For Diesel vehicles, operate the heated hydrocarbon analyzer, sampling line and filter to ±10° F in the temperature range of 300 to 390 F.

(2) Zero the hydrocarbon analyzer with zero grade air and the carbon monoxide, carbon dioxide, and oxides of nitrogen analyzers with zero grade air or zero grade nitrogen. The allowable zero gas impurity concentrations should not exceed 1 p.p.m. equivalent carbon response, 1 p.p.m. carbon monoxide, 400 p.p.m. (0.04 mole percent) carbon dioxide and 0.1 p.p.m. nitric oxide.

(3) Set the CO and CO_2 analyzer gains to give the desired ranges. Select the desired attenuation scale of the HC analyzer, set the sample capillary flow rate by adjusting the back pressure regulator, and adjust the electronic gain control, if provided, to give the desired range. Select the desired scale of the NOx analyzer and adjust the phototube high voltage supply or amplifier gain to give the desired range.

(4) Calibrate the HC analyzer with propane (air diluent) gases having nominal concentrations equal to 50 and 100 percent of full scale. Calibrate the CO analyzer with carbon monoxide (nitrogen diluent) gases and the CO_2 analyzer with carbon dioxide (nitrogen diluent) gases having nominal concentrations equal to 10, 25, 40, 50, 60, 70, 85, and 100 percent of full scale. Calibrate the NOx analyzer with nitric oxide (nitrogen diluent) gases having nominal concentrations equal to 50 and 100 percent of full scale. The actual concentrations should be known to within ±2 percent of the true values.

(5) Compare values obtained on the CO and CO_2 analyzers with previous calibration curves. Any significant change reflects some problem in the system. Locate and correct problem, and recalibrate. Use best judgment in selecting curves for data reduction.

(6) NOx converter efficiency determination. The apparatus described and illustrated in Figure 6 or Figure 7 is to be used to determine the conversion efficiency of devices that convert NOx to NO. The following procedure is to be used for determining the values to be used in Equation (A).

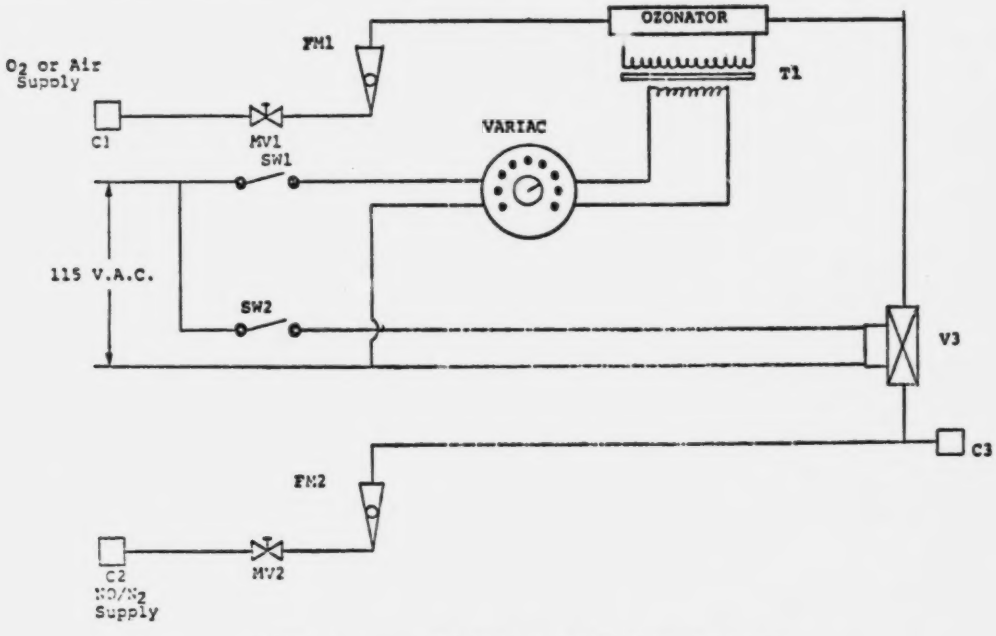

Figure 6 - NOx Converter Efficiency Detector

90-128 O—82——44

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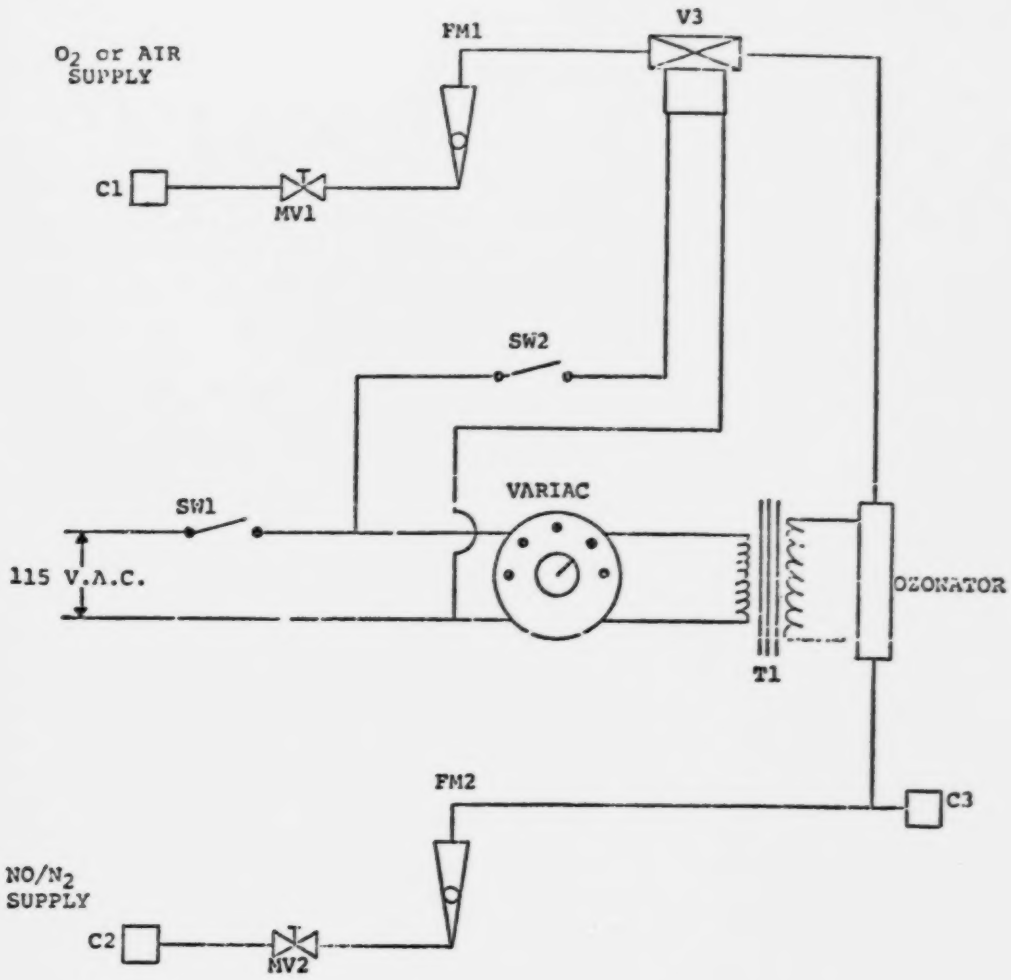

Figure 7 - NOx Converter Efficiency Detector

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(i) Attach the NO/N_2 supply (150-250 p.p.m.) at C2, the O_2 supply at C1 and the analyzer inlet connection to the efficiency detector at C3. If lower concentrations of NO are used, air may be used in place of O_2 to facilitate better control of the NO_2 generated during step (iv).

(ii) With the efficiency detector variac off, place the NOx converter in bypass mode and close valve V3. Open valve MV2 until sufficient flow and stable readings are obtained at the analyzer. Zero and span the analyzer output to indicate the value of the NO concentration being used. Record this concentration.

(iii) Open valve V3 (on/off flow control solenoid valve for O_2) and adjust valve MV1 (O_2 supply metering valve) to blend enough O_2 to lower the NO concentration (ii) about 10 percent. Record this concentration.

(iv) Turn on the ozonator and increase its supply voltage until the NO concentration of (iii) is reduced to about 20 percent of (ii). NO_2 is now being formed from the $NO+O_2$ reaction. There must always be at least 10 percent unreacted NO at this point. Record this concentration.

(v) When a stable reading has been obtained from (iv), place the NOx converter in the convert mode. The analyzer will not indicate the total NOx concentration. Record this concentration.

(vi) Turn off the ozonator and allow the analyzer reading to stabilize. The mixture $NO+O_2$ is still passing through the converter. This reading is the total NO_x concentration of the dilute NO span gas used at Step (iii). Record this concentration.

(vii) Close valve V3. The NO concentration should be equal to or greater than the reading of (ii) indicating whether the NO contains any NO_2. Calculate the efficiency of the NOx converter by substituting the concentrations obtained during the test into Equation (A).

$$\% \text{ Eff.} = (v)-(iv)/(vi)-(iv) \times 100 \text{ percent} \quad \text{(A)}$$

The efficiency of the converter should be greater than 90 percent. Adjustment of the converter temperature may be needed to maximize the efficiency. Efficiency checks should be made on each analyzer range using an NO span gas concentration appropriate to the instrument range. See alternate procedure in paragraph (a)(6)(viii).

(viii) Alternative to paragraph (a)(6)(vii): Close valve V3. The NO concentration should be equal to or greater than the reading of (ii) indicating whether the NO contains any NO_2.

Calculate the efficiency of the NO converter by substituting the concentrations obtained during the test into Equation (B).

$$\% \text{ Eff.} = 1+(v\text{-}vi)/(iii\text{-}iv) \times 100 \text{ percent} \quad \text{(B)}$$

The efficiency of the converter should be greater than 90 percent. Adjusting the converter temperature may be needed to maximize the efficiency. Although steps (ii) and (vii) are not used in the calculations, their values should be recorded to complete the data set for the test sequence. This procedure does not depend on the amount of NO_2 in the span gas nor the equivalence of flows in the bypass and converter modes; however, to be consistent with good operating practice, flows should be nominally the same, and the NO_2 concentration. Efficiency checks should be made at a frequency (daily to weekly) consistent with good quality assurance provisions.

(7) Check the efficiency of the sample conditioning system, if used, by the following procedure:

(i) Zero and span the CO instrument on its most sensitive scale.

(ii) Recheck zero.

(iii) Bubble a mixture of 3% CO_2 in N_2 through water at room temperature (68°-86° F), through the conditioning column into the CO instrument. If the response meets the criteria of Section XI(a)(3)(xi) or Section XI(b)(3)(xi) as applicable, then the conditioning column is functioning acceptably. If the response is higher than the specified limit, a new conditioning column should be installed and the test repeated.

(iv) Sample conditioning systems should be checked at a frequency consistent with observed column life or when the indicator of the column packing begins to show deterioration.

(b) HC, CO, CO_2, and NOx measurements: (When testing Diesel vehicles allow the HC analyzer sample line and filter to heat to a set point ±10° F between 300° and 390° F.) Allow a minimum of 20 minutes warmup for the HC analyzer and 2 hours for the CO, CO_2, and NOx analyzers. (Power is normally left on infrared and chemiluminescence analyzers; but when not in use, the chopper motors of the infrared analyzers are turned off and the phototube high voltage supply of the chemiluminescence analyzer is placed in the standby position.) The following sequences of operations should be performed in conjunction with each series of measurements:

(1) Zero the analyzers. Obtain a stable zero on each amplifier meter and recorder. Recheck after tests.

(2) Introduce span gases and set the CO and CO_2 analyzer gains, the HC analyzer sample capillary flow rate and the NOx analyzer high voltage supply or amplifier gain to match the calibration curves. In order to avoid corrections, span and calibrate at the same flow rates used to analyze the test

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samples. Span gases should have concentrations equal to approximately 80 percent of full scale. If gain has shifted significantly on the CO or CO_2 analyzers, check tuning. If necessary, check calibration. Recheck after test. Show actual concentrations on chart.

(3) Check zeros; repeat the procedure in paragraphs (b) (1) and (2) of this section if required.

(4) Check flow rates and pressures.

(5) For Diesel vehicles continuously record (and integrate electronically, if desired) dilute hydrocarbon emission levels during test.

(6) Measure CO, CO_2, and NOx concentrations of samples, also HC for gasoline-fueled vehicles. Care should be exercised to prevent moisture from condensing in the sample collection bag.

(7) Check zero and span points.

(c) For the purposes of this section, the term "zero grade air" includes artificial "air" consisting of a blend of nitrogen and oxygen with oxygen concentrations between 18 and 21 mole percent.

XIII. *Dynamometer test runs.* (a) The vehicle shall be allowed to stand with the engine turned off for a period of not less than 12 hours before the cold start exhaust emission test (gasoline-fueled vehicles shall be stored at an ambient temperature specified in Section IV of this appendix). The vehicle shall be stored prior to the emission tests in such a manner that precipitation (e.g. rain or dew) does not occur on the vehicle. The complete dynamometer test consists of a cold start drive of 7.5 miles and simulates a hot start drive of 7.5 miles. The vehicle is allowed to stand on the dynamometer during the 10-minute time period between the cold and hot start tests. The cold start test is divided into two periods. The first period, representing the cold start "transient" phase, terminates at the end of the deceleration which is scheduled to occur at 505 seconds of the driving schedule. The second period, representing the "stabilized" phase, consists of the remainder of driving schedule including engine shutdown. The hot start test similarly consists of two periods. The first period, representing the hot start "transient" phase, terminates at the same point in the driving schedule as the first phase of the cold start test. The second period of the hot start test, "stabilized" phase, is assumed to be identical to the second period of the cold start test. Therefore, the hot start test terminates after the first period (505 seconds) is run. During the tests the ambient temperature shall be between 68° F and 86° F.

(b) The following steps shall be taken for each test:

(1) Place drive wheels of vehicle on dynamometer without starting engine.

(2) Open the vehicle engine compartment cover and start the cooling fan.

(3) With the sample solenoid valves in the "dump" position connect evacuated sample collection bags to the two dilute exhaust sample connectors and to the two dilution air sample line connectors.

(4) Start the positive displacement pump (if not already on), the sample pumps, heated hydrocarbon analysis recorder (Diesel only) and the temperature recorder. (The heat exchanger of the constant volume sampler, the Diesel hydrocarbon analyzer continuous sample line and filter (if applicable) should be preheated to their respective operating temperatures before the test begins.)

(5) Adjust the sample flow rates to the desired flow rate (minimum of 10 c.f.h.) and set the revolution counters to zero. Also set Diesel hydrocarbon integrator counters to zero, if applicable.

(6) Attach the flexible exhaust tube to the vehicle tailpipe(s).

(7) Simultaneously start the revolution counter for the positive displacement pump, position the sample solenoid valves to direct the sample flow into the "transient" exhaust sample bag and the "transient" dilution air sample bag (turn on the Diesel hydrocarbon analyzer system integrator and mark the recorder chart, if applicable), and start cranking the engine.

(8) Fifteen seconds after the engine starts, place the transmission in gear.

(9) Twenty seconds after the engine starts, begin the initial vehicle acceleration of the driving schedule.

(10) Operate the vehicle according to the dynamometer driving schedule (Section V).

(11) At the end of the deceleration which is scheduled to occur at 505 seconds, simultaneously switch the sample flows from the "transient" bags to the "stabilized" bags, switch off revolution counter No. 1 (and the Diesel hydrocarbon integrator No. 1, mark the Diesel hydrocarbon recorder chart) and start counter No. 2 (and the Diesel hydrocarbon integrator No. 2). As soon as possible and in no case longer than 20 minutes after the end of this portion of the test disconnect the "transient" exhaust and dilution air sample bags, transfer them to the analytical system and process the samples according to Section XII.

(12) Turn the engine off 2 seconds after the end of the last deceleration (at 1,369 seconds).

(13) Five seconds after the engine stops running, simultaneously turn off revolution counter No. 2 (and the Diesel hydrocarbon integrator No. 2, mark the hydrocarbon recorder chart, if applicable) and position the sample solenoid valves to the "dump" position. As soon as possible and in no case longer than 20 minutes after the end of this

portion of the test disconnect the "stabilized" exhaust and dilution air sample bags, transfer them to the analytical system and process the samples according to Section XII.

(14) Immediately after the end of the sample period turn off the cooling fan and close the engine compartment cover.

(15) Turn off the positive displacement pump or disconnect the exhaust tube from the tailpipe(s) of the vehicle.

(16) Repeat the steps in paragraphs (b)(2) through (10) of this section for the hot start test except only one evacuated sample bag is required for sampling exhaust gas and one for dilution air. The step in paragraph (b)(7) of this section shall begin between 9 and 11 minutes after the end of the sample period for the cold start test.

(17) At the end of the deceleration which is scheduled to occur at 505 seconds, simultaneously turn off the No. 1 revolution counter (and Diesel hydrocarbon integrator No. 1, mark the Diesel hydrocarbon recorder chart, if applicable) and position the sample solenoid valve to the "dump" position. (Engine shutdown is not part of the hot start test sample period.)

(18) As soon as possible and in no case longer than 20 minutes after the end of this portion of the test disconnect the hot start "transient" exhaust and dilution air sample bags, transfer them to the analytical system and process the samples according to Section XII.

(19) Disconnect the exhaust tube from the vehicle tailpipe(s) and the vehicle may be removed from the dynamometer.

(20) The positive displacement pump may be turned off, if desired.

XIV. *Chart reading.* (a) Gasoline-fueled light duty vehicles and light duty trucks:

(1) Determine the HC, CO, CO_2, and NOx concentrations of the dilution air and dilute exhaust sample bags from the instrument deflections or recordings making use of appropriate calibration charts.

(2) Determine the average dilute exhaust mixture temperatures from the temperature recorder trace if the recorder is used.

(b) Diesel light duty vehicles and light duty trucks:

(1) Determine the HC, CO, CO_2, and NOx concentrations of the dilution air and the CO, CO_2, and NOx concentration of the dilute exhaust sample bags from the instrument deflections, computer printout, or recordings making use of appropriate calibration charts.

(2) Record integrated HC results, or manually integrate continuous chart. This chart provides a permanent record and can be graphically integrated if verification of the results of electronic integration is required.

(3) Determine the average dilute exhaust mixture temperatures from the temperature recorder trace if a recorder is used.

XV. *Calculations.* The individual reported test results shall be computed by use of the following formula:

(a) For light duty vehicles and light duty trucks:

$$Ywm = (0.43\ Yct + 0.57\ Yht + Ys)/7.5$$

Where:

Ywm = Weighted mass emissions of each pollutant, i.e. HC, CO, or NOx, in grams per vehicle mile.

Yct = Mass emissions as calculated from the "transient" phase of the cold start test, in grams per test phase.

Yht = Mass emissions as calculated from the "transient" phase of the hot start test, in grams per test phase.

Ys = Mass emissions as calculated from the "stabilized" phase of the cold start test, in grams per test phase.

(b) The mass of each pollutant for each phase of both the cold start test and hot start test is determined from the following:

(1) Hydrocarbon Mass:

$$HCmass = Vmix \times DensityHC \times HCconc/1{,}000{,}000$$

(2) Oxides of nitrogen Mass:

$$NOxmass = Vmix \times Density NO_2 \times (NOxconc/1{,}000{,}000) \times KH$$

(3) Carbon monoxide Mass:

$$COmass = Vmix \times DensityCO \times COconc/1{,}000{,}000$$

(c) Meaning of symbols:

HCmass = Hydrocarbon emissions, in grams per test phase.

DensityHC = Density of hydrocarbons in the exhaust gas, assuming an average carbon to hydrogen ratio of 1:1.85, in grams per cubic foot at 68° F. and 760 mm. Hg pressure (16.33 gm./cu. ft.).

HCconc = Hydrocarbon concentration of the dilute exhaust sample corrected for background, in p.p.m. carbon equivalent, i.e. equivalent propane × 3.

$$HCconc = HCe - HCd(1 - 1/DF)$$

Where:

HCe = Average hydrocarbon concentrations of the dilute exhaust sample as measured from the sample bag or as calculated from the integrated HC traces, in p.p.m. carbon equivalent.

HCd = Hydrocarbon concentration of the dilution air as measured in p.p.m. carbon equivalent.

NOxmass = Oxides of nitrogen emissions, in grams per test phase.

DensityNO_2 = Density of oxides of nitrogen in the exhaust gas, assuming they are in the form of nitrogen dioxide, in grams per cubic foot at 68° F. and 760 mm. Hg pressure (54.16 gm./cu. ft.).

NOxconc = Oxides of nitrogen concentration of the dilute exhaust sample corrected for background, in p.p.m.

$$NOxconc = NOxe - NOxd(1 - 1/DF)$$

Where:

NOxe = Oxides of nitrogen concentration of the dilute exhaust sample as measured, in p.p.m.

NOxd = Oxides of nitrogen concentration of the dilution air as measured, in p.p.m.

COmass = Carbon monoxide emissions, in grams per test phase.

DensityCO = Density of carbon monoxide in grams per cubic foot at 68° F. and 760 mm. Hg pressure (32.97 gm./cu. ft.).

COconc = Carbon monoxide concentration of the dilute exhaust sample corrected for background, water vapor and CO_2 extraction, in p.p.m.

$$COconc = COe - COd\,(1 - 1/DF)$$

Where:

COe = Carbon monoxide concentration of the dilute exhaust sample volume corrected for water vapor and carbon dioxide extraction, in p.p.m. The calculation assumes the carbon to hydrogen ratio of the fuel is 1:1.85.

$$COe = (1 - 0.01925\ CO_2e - 0.000323R)\ COem$$

Where:

COem = Carbon monoxide concentration of the dilute exhaust sample as measured in p.p.m.

CO_2e = Carbon dioxide concentration of the dilute exhaust sample, in mole percent.

R = Relative humidity of the dilution air, in percent.

COd = Carbon monoxide concentration of the dilution air corrected for water vapor extraction, in p.p.m.

$$COd = (1 - 0.000323R)\ COdm$$

Where:

COdm = Carbon monoxide concentration of the dilution air sample as measured, in p.p.m.

NOTE: If a CO instrument which meets the criteria specified in Section XI(a)(3)(xi) or Section XI(b)(3)(xi) is used and the conditioning column has been deleted, COem can be substituted directly for COe and COdm can be substituted directly for COd.

$$DF = 13.4/CO_{2e} + (HC_e + CO_e) \times 10^{-4}$$

Vmix = Total dilute exhaust volume in cubic feet per test phase corrected to standard conditions (528° R and 760 mm. Hg).

$$Vmix = Vo \times N\,(P_B - P_4)(528^\circ R)/(760\text{ mm. Hg})\,(Tp)$$

Where:

Vo = Volume of gas pumped by the positive displacement pump, in cubic feet per revolution. This volume is dependent on the pressure differential across the positive displacement pump. (See calibration techniques in Appendix III to 40 CFR 86.)

N = Number of revolutions of the positive displacement pump during the test phase while samples are being collected.

PB = Barometric pressure in mm. Hg.

P4 = Pressure depression below atmospheric measured at the inlet to the positive displacement pump.

Tp = Average temperature of dilute exhaust entering positive displacement pump during test while samples are being collected, in degrees Rankine.

KH = Humidity correction factor.

$$KH = 1/1 - 0.0047(H - 75)$$

NOTE: The constant 0.0047 will be updated to reflect any data which becomes available on Light-Duty Diesel engine tests.

Where:

H = Absolute humidity in grains of water per pound of dry air.

$$H = ((43.478)Ra \times Pd)/(PB - (Pd \times Ra/100))$$

Ra = Relative humidity of the ambient air, in percent.

Pd = Saturated vapor pressure, in mm. Hg. at the ambient dry bulb temperature.

(d) Example calculation of mass emissions values:

(1) For the "transient" phase of the cold start test assume Vo = 0.29344 cu. ft. per revolution; N = 10,485; R = 48.0 percent; Ra = 48.2 percent; PB = 762 mm. Hg; Pd = 22.225 mm. Hg; P4 = 70 mm. Hg; Tp = 570° R; HCe = 105.8 p.p.m. carbon equivalent; NOxe = 11.2 p.p.m.; COem = 306.6 p.p.m.; CO_2e = 1.43 percent; HCd = 12.1 p.p.m.; NOxd = 0.8 p.p.m.; COdm = 15.3 p.p.m.

Then:

Vmix = (0.29344) (10,485) (762 − 70) (528)/(760)(570) = 2595.0 cu. ft. per test phase.

H = (43.478)(48.2)(22.225)/762 − (22.225 × 48.2/100).

Kh = 1/1 − 0.0047(62 − 75) = .9424.

COe = (1 − 0.01925(1.43) − 0.000323(48)) 306.0 = 293.4 p.p.m.

COd = (1 − 0.000323(48))15.3 = 15.1 p.p.m.

DF = 13.4/1.43 + (105.8 + 293.4) × 1 0 − 4 = 9.116.

HCconc = 105.8 − 12.1(1 − 1/9.116) = 95.03.

HCmass = (2595)(16.33)(95.03/1,000,000) = 4.027 grams per test phase.

NOxconc = 11.2 − 0.8(1 − 1/9.116) = 10.49.

NOxmass = (2595)(54.16)(10.49/1,000,000) (0.9424) = 1.389 grams per test phase.

COconc = 293.4 − 15.1(1 − 1/9.116) = 280.

COmass = (2595)(32.97)(280.1,000,000) = 23 .96 grams per test phase.

(2) For the "stabilized" portion of the cold start test assume that similar calculations resulted in HCmass=0.62 grams per test phase; NOxmass=1.27 grams per test phase; and COmass=5.98 grams per test phase.

(3) For the "transient" portion of the hot start test assume that similar calculations resulted in HCmass=0.51 grams per test phase; NOxmass=1.38 grams per test phase; and COmass=5.01 grams per test phase.

(4) Results:

HCwm=((0.43)(4.027)+(0.57)(0.51)+0.62)/7.5=0.352 grams per vehicle mile.

NOxwm=((0.43)(1.389)+(0.57)(1.38)+1.27)/7.5=0.354 grams per vehicle mile.

COwm=((0.43)(23.96)+(0.57)(5.01)+5.98)/7.5=2.55 grams per vehicle mile.

[41 FR 31492, July 28, 1976, as amended at 45 FR 14525, Mar. 5, 1980]

Appendix X—Sampling Plans for Selective Enforcement Auditing of Heavy-Duty Engines and Light-Duty Trucks

Table 1—Sampling Plan Code Letter

Annual sales	Code letter
50-99	A
100-199	B
200-399	C
400 or greater	D

Table 2—Sample Plan for Code Letter "A"

[Sample inspection criteria]

Stage	Pass No.	Fail No.
1	(1)	(2)
2	(1)	(2)
3	(1)	3
4	(1)	3
5	(1)	3
6	(1)	3
7	0	3
8	0	4
9	0	4
10	0	4
11	1	4
12	1	4
13	1	5
14	1	5
15	1	5
16	2	5
17	2	5
18	2	5
19	2	6
20	2	6
21	3	6
22	3	6
23	3	6
24	3	6
25	4	6
26	4	7
27	4	7
28	4	7
29	4	7
30	6	7

[1]Test sample passing not permitted at this stage.
[2]Test sample failure not permitted at this stage.

Table 3—Sample Plan for Code Letter "B"

[Sample inspection criteria]

Stage	Pass No.	Fail No.
1	(1)	(2)
2	(1)	(2)
3	(1)	3
4	(1)	3
5	(1)	3
6	(1)	3
7	0	4
8	0	4
9	0	4
10	0	4
11	0	4
12	1	5
13	1	5
14	1	5
15	1	5
16	1	5
17	2	6
18	2	6
19	2	6
20	2	6
21	3	6
22	3	7
23	3	7
24	3	7
25	3	7
26	4	7
27	4	7
28	4	8
29	4	8
30	4	8
31	5	8
32	5	8
33	5	8
34	5	9
35	6	9
36	6	9
37	6	9
38	6	9
39	6	9
40	8	9

(1) Test sample passing not permitted at this stage.
(2) Test sample failure not permitted at this stage.

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TABLE 4—SAMPLE PLAN FOR CODE LETTER "C"

[Sample inspection criteria]

Stage	Pass No.	Fail No.
1	(1)	(1)
2	(1)	(1)
3	(1)	3
4	(1)	3
5	(1)	3
6	(1)	4
7	0	4
8	0	4
9	0	4
10	0	4
11	0	5
12	1	5
13	1	5
14	1	5
15	1	5
16	1	6
17	2	6
18	2	6
19	2	6
20	2	6
21	3	7
22	3	7
23	3	7
24	3	7
25	3	7
26	4	8
27	4	8
28	4	8
29	4	8
30	4	8
31	5	8
32	5	9
33	5	9
34	5	9
35	5	9
36	6	9
37	6	10
38	6	10
39	6	10
40	6	10
41	7	10
42	7	11
43	7	11
44	7	11
45	8	11
46	8	11
47	8	11
48	8	11
49	8	11
50	10	11

(1) Test sample passing not permitted at this stage.
(2) Test sample failure not permitted at this stage.

TABLE 5—SAMPLE PLAN FOR CODE LETTER "D"

[Sample inspection criteria

Stage	Pass No.	Fail No.
1	(1)	(2)
2	(1)	(2)
3	(1)	3
4	(1)	3
5	(1)	3
6	(1)	4

TABLE 5—SAMPLE PLAN FOR CODE LETTER "D"—Continued

[Sample inspection criteria

Stage	Pass No.	Fail No.
7	0	4
8	0	4
9	0	4
10	0	4
11	0	5
12	1	5
13	1	5
14	1	5
15	1	5
16	1	6
17	2	6
18	2	6
19	2	6
20	2	6
21	2	7
22	3	7
23	3	7
24	3	7
25	3	7
26	3	8
27	4	8
28	4	8
29	4	8
30	4	8
31	4	9
32	5	9
33	5	9
34	5	9
35	5	9
36	6	10
37	6	10
38	6	10
39	6	10
40	6	11
41	7	11
42	7	11
43	7	11
44	7	11
45	7	12
46	8	12
47	8	12
48	8	12
49	8	12
50	8	13
51	9	13
52	9	13
53	9	13
54	9	13
55	9	13
56	10	13
57	10	13
58	10	13
59	10	13
60	12	13

(1) Test sample passing not permitted at this stage.
(2) Test sample failure not permitted at this stage.

[45 FR 63783, Sept. 25, 1980]

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PART 87—CONTROL OF AIR POLLUTION FROM AIRCRAFT AND AIRCRAFT ENGINES

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87.2 Abbreviations.
87.3 General requirements.
87.4 Test conditions.
87.5 Special test procedures.
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87.10 Applicability.
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87.20 Applicability.
87.21 Standards for exhaust emissions.

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87.30 Applicability.
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87.101 Application for temporary exemption.
87.102 Thirty-day suspension of fuel venting and smoke standards.

APPENDIX A—INSTRUMENTATION (AIRCRAFT GAS TURBINE ENGINE MEASUREMENTS)
APPENDIX B—INSTRUMENTATION (AIRCRAFT PISTON ENGINE MEASUREMENTS)

AUTHORITY: Sec. 231 of the Clean Air Act, as amended (42 U.S.C. 1857f-9, 1857(f), 1857(g)).

SOURCE: 38 FR 19090, July 17, 1973, unless otherwise noted.

Subpart A—General Provisions

§ 87.1 Definitions.

(a) As used in this part, all terms not defined herein shall have meaning given them in the Act:

(1) "Act" means the Clean Air Act, as amended by Public Law 91-604.

(2) "Administrator" means the Administrator of the Environmental Protection Agency to whom the authority involved may be delegated.

(3) "Aircraft" means any airplane for which a U.S. standard airworthiness certificate or equivalent foreign airworthiness certificate is issued.

(4) "Aircraft engine" means a propulsion engine which is installed in or which is manufactured for installation in an aircraft.

(5) "Aircraft gas turbine engine" means a turboprop, turbofan, or turbojet aircraft engine.

(6) "New aircraft gas turbine engine" means an aircraft gas turbine engine which has never been in service.

(7) "New aircraft piston engine" means an aircraft piston engine which has never been in service.

(8) "In-use aircraft gas turbine engine" and "in-use aircraft piston engine" mean an aircraft gas turbine engine or aircraft piston engine (as appropriate) which is in service.

(9) "Newly certified aircraft gas turbine engine" means an aircraft gas turbine engine which is originally type certified on or after the effective date of the applicable emission standard.

(10) "Rated power" means the maximum power/thrust available for takeoff at standard day conditions as approved for the engine by the Federal Aviation Administration.

(11) "Standard day conditions" means standard ambient conditions as described in the United States Standard Atmosphere, 1962 (i.e., temperature = 59° F, relative humidity = 0%, and pressure = 29.92 inches Hg).

(12) "Power setting" means the power output of an engine in terms of pounds thrust for turbojet and turbofan engines and shaft horsepower for turboprop and piston engines.

(13) "Pound-thrust/hr." means pounds of thrust for 1 hour.

(14) "Shaft horsepower" means only the measured shaft power output of an auxiliary power unit, turboprop, or piston engine.

(15) "Auxiliary power unit" means any engine installed in or on an aircraft exclusive of the propulsion engines.

(16) "Class T1" means all aircraft turbofan or turbojet engines except engines of Class T5 of rated power less than 8,000 pounds thrust.

(17) "Class T2" means all turbofan or turbojet aircraft engines except engines of Class T3, T4, and T5 of rated power of 8,000 pounds thrust or greater.

(18) "Class T3" means all aircraft gas turbine engines of the JT3D model family.

(19) "Class T4" means all aircraft gas turbine engines of the JT8D model family.

(20) "Class T5" means all aircraft gas turbine engines employed for propulsion of aircraft designed to operate at supersonic flight speeds.

(21) "Class P1" means all aircraft piston engines, except radial engines.

(22) "Class P2" means all aircraft turboprop engines.

(23) "Taxi/idle(in)" means those aircraft operations involving taxi and idle between the time of landing roll-out and final shutdown of all propulsion engines.

(24) "Taxi/idle (out)" means those aircraft operations involving taxi and idle between the time of initial starting of the propulsion engine(s) used for the taxi and turn onto duty runway.

(25) "Exhaust emissions" means substances emitted to the atmosphere from the exhaust discharge nozzle of an aircraft or aircraft engine.

(26) "Fuel venting emissions" means all raw fuel, exclusive of hydrocarbons in the exhaust emissions, discharged from aircraft gas turbine engines during all normal ground and flight operations.

(27) "Smoke" means the matter in exhaust emissions which obscures the transmission of light.

(28) "Smoke number (SN)" means the dimensionless term quantifying smoke emissions.

(29) "Oxides of nitrogen" means the sum of the amounts of the nitric oxide and nitrogen dioxide contained in a gas sample as if the nitric oxide were in the form of nitrogen dioxide.

(30) "Calibration gas" means a gas of known concentration which is used to establish the response curve of an analyzer.

(31) "Span gas" means a gas of known concentration which is used routinely to set the output level of an analyzer.

(32) "Reference day conditions" means the reference ambient conditions to which the gaseous emissions (HC, CO, CO_2, NOx and smoke) are to be corrected. The reference day conditions are as follows: Temperature = 59° F, specific humidity = 44 grains of water per pound of dry air, and pressure = 29.92 inches of Hg.

(33) "Sample System" means the system which provides for the transportation of the gaseous emission sample from the sample probe to the inlet of the instrumentation system.

(34) "Instrumentation System" means the system which consists of the analytical instruments necessary to measure the level of emissions plus any required support equipment.

(35) "Emission Measurement System" means all of the equipment necessary to transport and measure the level of emissions. This includes

the sample system and the instrumentation system.

[38 FR 19090, July 17, 1973, as amended at 41 FR 39745, Sept. 16, 1976]

§ 87.2 Abbreviations.

The abbreviations used in this part have the following meanings in both upper and lower case:

abs	Absolute.
ASA	American Standards Association.
ASTM	American Society for Testing and Materials.
b hp	Brake horsepower.
c f h	Cubic feet per hour.
c f m	Cubic feet per minute.
C	Centigrade.
cc	Cubic centimeter.
$C_{}$	Carbon dioxide.
CO	Carbon monoxide.
EPR	Engine pressure ratio.
F	Fahrenheit.
FAA	Federal Aviation Administration, Department of Transportation.
FID	Flame ionization detector.
H	Specific Humidity, grains of water per pound of dry air.
H/C	Hydrogen to carbon atomic ratio.
HC	Hydrocarbon(s).
Hg	Mercury.
hp	Horsepower.
hp-hr	Horsepower-hr.
hr	Hour(s).
in.HgV	Inches of mercury, vacuum.
I.D.	Inside diameter.
lb	Pound(s).
LTO	Landing takeoff.
min	Minute(s).
mm	Millimeter(s).
N_1	First-stage rotor speed.
N_2	Second-stage rotor speed or nitrogen (as applicable).
N_3	Third-stage rotor speed.
NO	Nitric oxide.
NO_2	Nitrogen dioxide.
NOx	Oxides of nitrogen, NO and NO_2.
NDIR	Nondispersive infrared analyzer.
O_2	Oxygen.
O_3	Ozone.
P	Pressure, pounds per square inch.
p.p.m.	Parts per million by volume.
p.p.m.C	Parts per million carbon.
PT_7	Total pressure at station 7.
R	Rankine.
r.p.m.	Revolutions per minute.
s.c.f.h.	Standard cubic feet per hour.
s.c.f.m.	Standard cubic feet per minute.
sec	Second(s).
SHP	Shaft horsepower.
SN	Smoke number.
T	Temperature, degrees Fahrenheit.
TIM	Time in mode.
TT_7	Total temperature at station 7.
°	Degree.
%	Percent.

(Secs. 231, 301 of the Clean Air Act, as amended (42 U.S.C. 7571, 7601, formerly 42 U.S.C. 1857f-9, 1857g))

[38 FR 19090, July 17, 1973, as amended at 41 FR 39745, Sept. 16, 1976; 45 FR 1421, Jan. 7, 1980]

§ 87.3 General requirements.

(a) This part provides for the approval or acceptance by the Administrator or his agents of testing and sampling methods, analytical techniques, and related equipment not identical to those specified in this part. Before he approves or accepts any such alternate, equivalent, or otherwise nonidentical procedures or equipment, the Administrator shall consult with the Secretary of Transportation in determining whether or not the action requires rule making under sections 231 and 232 of the Clean Air Act, as amended, consistent with the Secretary's responsibilities under section 232 of the Act.

(b) Under section 232 of the Act, the Secretary of Transportation issues regulations to insure compliance with this part and all amendments thereof.

(c) With respect to aircraft of foreign registry, these regulations shall apply in a manner consistent with any obligation assumed by the United States in any treaty, convention or agreement between the United States and any foreign country or foreign countries.

§ 87.4 Test conditions.

The complete engine as configured for final acceptance testing, including all accessories which might reasonably be expected to influence emissions to the atmosphere excluding auxiliary gearbox-mounted components required to drive aircraft systems and service air bleed, shall be functional for all testing in this part.

§ 87.5 Special test procedures.

The Administrator may, upon written application by a manufacturer or operator of aircraft or aircraft engines, prescribe test procedures for any aircraft or aircraft engine that is not susceptible to satisfactory testing by the procedures set forth herein. Prior to taking action on any such application, the Administrator shall consult with the Secretary of Transportation.

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§ 87.6 Aircraft safety.

The provisions of this part will be revised if at any time the Secretary of Transportation determines that an emission standard cannot be met within the specified time without creating a safety hazard.

§ 87.7 Exemptions.

The emission standards of this part do not apply to engines which power aircraft operated in the United States for short durations at infrequent intervals. Such operations are limited to:

(a) Flights of an aircraft for the purpose of export to a foreign country, including any flights essential to demonstrate the integrity of an aircraft prior to its flight to a point outside the United States;

(b) Flights to a base where repairs, alterations or maintenance are to be performed, or to a point of storage, and flights for the purpose of returning an aircraft to service;

(c) Official visits by representatives of foreign governments; and

(d) Other flights the Secretary of Transportation determines, after consultation with the Administrator of the Environmental Protection Agency, to be for short durations at infrequent intervals. A request for such a determination shall be made before the flight takes place.

(Secs. 231 and 301(a) of the Clean Air Act, as amended (42 U.S.C. 7571 and 7601(a)))

[45 FR 86947, Dec. 31, 1980]

Subpart B—Engine Fuel Venting Emissions (New and In-Use Aircraft Gas Turbine Engines)

§ 87.10 Applicability.

The provisions of this subpart are applicable to each new aircraft gas turbine engine of classes T2, T3, T4, and T5 manufactured on or after January 1, 1974, and all in-use aircraft gas turbine engines of classes T2, T3, T4, and T5 beginning January 1, 1974, and each new aircraft gas turbine engine of Classes T1 and P2 manufactured on or after January 1, 1975 and all in-use aircraft gas turbine engines of classes T1 and P2 beginning January 1, 1975.

§ 87.11 Standard for fuel venting emissions.

(a) No fuel venting emissions shall be discharged into the atmosphere from any new or in-use gas turbine engine subject to the subpart. This paragraph is directed at the elimination of intentional discharge to the atmosphere of fuel drained from fuel nozzle manifolds after engines are shut down and does not apply to normal fuel seepage from shaft seals, joints, and fittings.

(b) Conformity with the standard set forth in paragraph (a) of this section shall be determined by inspection of the method designed to eliminate these emissions.

[38 FR 19090, July 17, 1973, as amended at 39 FR 4884, Feb. 8, 1974]

Subpart C—Exhaust Emissions (New Aircraft Gas Turbine Engines)

§ 87.20 Applicability.

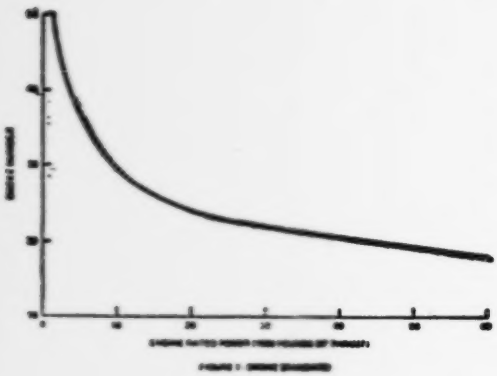
The provisions of this subpart are applicable to all aircraft gas turbine engines of the classes specified beginning on the dates specified.

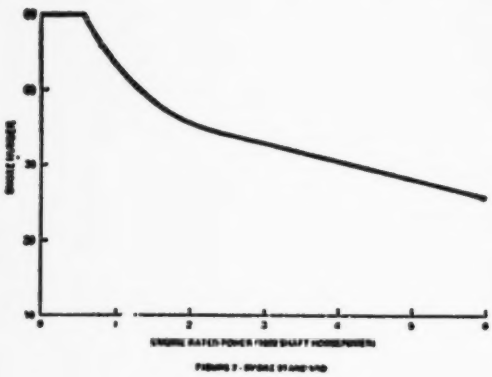
§ 87.21 Standards for exhaust emissions.

(a) Exhaust emissions of smoke from each new aircraft gas turbine engine of class T4 manufactured on or after January 1, 1974, shall not exceed: Smoke number of 30.

(b) Exhaust emissions of smoke from each new aircraft gas turbine engine of class T2 and of rated power of 29,000 pounds thrust or greater, manufactured on or after January 1, 1976 shall not exceed: Applicable smoke number from Figure 1.

(c) Exhaust emissions of smoke from each new aircraft gas turbine engine of class T3 manufactured on or after January 1, 1978, shall not exceed: Smoke number of 25.





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(d) Exhaust emissions from each aircraft gas turbine engine of the classes specified below manufactured on or after January 1, 1983, shall not exceed:

(1) Class T1:

(i) Hydrocarbons—1.6 pounds/1,000 pound-thrust hours/cycle.

(ii) Carbon monoxide—9.4 pounds/1,000 pound-thrust hours/cycle.

(iii) Oxides of nitrogen-3.7 pounds/1,000 pound-thrust hours/cycle.

(iv) Smoke—Smoke number from Figure 1.

(2) Class T2, T3, T4:

(i) Hydrocarbons—0.8 pounds/1,000 pound-thrust hours/cycle.

(ii) Carbon monoxide—4.3 pounds/1,000 pound-thrust hours/cycle.

(iii) Oxides of nitrogen—3 pounds/1,000 pound-thrust hours/cycle.

(iv) Smoke—Smoke number from Figure 1.

(3) Class P2:

(i) Hydrocarbons—4.9 pounds/1,000 horsepower-hours/cycle.

(ii) Carbon monoxide—26.8 pounds/1,000 horsepower—hours/cycle.

(iii) Oxides of nitrogen—12.9 pounds/1,000 horsepower-hours/cycle.

(iv) Smoke—Smoke number from Figure 2.

(4) Class T5:

(i) Hydrocarbons—3.9 pounds/1,000 pound-thrust hours/cycle.

(ii) Carbon monoxide—30.1 pounds/1,000 pound-thrust hours/cycle.

(iii) Oxides of nitrogen—9.0 pounds/1,000 pound-thrust hours/cycle.

(iv) Smoke—Smoke number from Figure 1.

(e) Exhaust emissions from each newly certified aircraft gas turbine engine of the classes specified below manufactured on or after the dates indicated shall not exceed:

(1) Class T2, T3, or T4 (January 1, 1983).

(2) Class T5 (January 1, 1984):

(i) Hydrocarbons—1.0 pound/1,000 pound-thrust hours/cycle.

(ii) Carbon monoxide—7.8 pounds/1,000 pound-thrust hours/cycle.

(iii) Oxides of nitrogen—5.0 pounds/1,000 pound-thrust hours/cycle.

(iv) Smoke—Smoke number from Figure 1.

(f) The standards set forth in paragraphs (a), (b), (c), (d), and (e) of this section refer to a composite gaseous emission sample representing the operating cycles set forth in the applicable sections of Subpart G of this part, and exhaust smoke emissions emitted during operations of the engine as specified in the applicable sections of Subpart H of this part, and measured and calculated in accordance with the procedures set forth in those subparts.

(Secs. 231 and 301(a) of the Clean Air Act, as amended (42 U.S.C. 7571 and 7601(a)))

[38 FR 19090, July 17, 1973, as amended at 41 FR 34725, Aug. 16, 1976; 43 FR 12614, Mar. 24, 1978; 45 FR 86947, Dec. 31, 1980]

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Subpart D—Exhaust Emissions (In-Use Aircraft Gas Turbine Engines)

§ 87.30 Applicability.

The provisions of this subpart are applicable to all in-use aircraft gas turbine engines certified for operation within the United States of the classes specified beginning on the dates specified.

[41 FR 39745, Sept. 16, 1976]

§ 87.31 Standards for exhaust emissions.

(a) Exhaust emissions of smoke from each in-use aircraft gas turbine engine of Class T4, beginning January 1, 1974, shall not exceed: Smoke number of 30.

(b) Exhaust emissions of smoke from each in-use aircraft gas turbine engine of class T2 and of rated power of 29,000 pounds thrust or greater, beginning January 1, 1976, shall not exceed: Applicable Smoke number from Figure 1.

(c) Exhaust emissions of smoke from each in-use aircraft gas turbine engine of Class T3 shall not exceed a smoke number of 25. Each operator shall achieve compliance in accordance with the following schedule:

(1) One quarter of its operational Class T3 engines by January 1, 1981.

(2) One half of its operational Class T3 engines by January 1, 1983.

(3) All of its operational Class T3 engines by January 1, 1985.

This compliance schedule notwithstanding, Class T3 engines which do not meet a smoke number of 25 may continue to be operated if, under an FAA approved plan, replacement engines or replacement airplanes have been ordered and are scheduled for delivery prior to January 1, 1985, but not after the dates specified in the plan. For the purpose of this paragraph, replacement engines are engines of a class different from Class T3 and have been shown to meet the smoke emission standards in this part appropriate to their class.

(d) The standards set forth in paragraphs (a), (b), and (c) of this section refer to exhaust smoke emissions emitted during operations of the engine as specified in the applicable section of Subpart H of this part, and measured and calculated in accordance with the procedures set forth in this subpart.

(e) In addition to the requirements imposed by paragraphs (a), (b), and (c) of this section, each in-use aircraft gas turbine engine shall not exceed the level of the emissions applicable to such engine when it was new.

(Secs. 231, 301(a), Clean Air Act, as amended (42 U.S.C. 7571, 7601(a)))

[38 FR 19090, July 17, 1973; 41 FR 39746, Sept. 16, 1976, as amended at 44 FR 64267, Nov. 6, 1979]

Subparts E–F—[Reserved]

Subpart G—Test Procedures for Engine Exhaust Gaseous Emissions (Aircraft and Aircraft Gas Turbine Engines)

§ 87.60 Introduction.

Except as provided under § 87.5, the procedures described in this subpart shall be the test program to determine the conformity of new and in-use aircraft gas turbine engines with the applicable standards set forth in this part.

(a) The test consists of operating the engine at prescribed power settings on an engine dynamometer (for engines producing primarily shaft horsepower) or thrust measuring test stand (for engines producing primarily thrust). The exhaust gases generated during engine operation are sampled continuously for specific component analysis through the analytical train.

(b) The exhaust emission test is designed to measure hydrocarbons, carbon monoxide, and oxides of nitrogen concentrations and determine mass emissions and engine work output through calculations during a simulated aircraft landing-takeoff cycle (LTO). The LTO cycle is based on time in mode data during high activity periods at major airports. The test for propulsion engines consists of at least the following five modes of engine operations: Taxi/idle (out), takeoff, climbout, approach, and taxi/idle (in). The mass emission and work output for the modes are combined to yield the reported values.

(c) When an engine is tested for exhaust emissions on an engine dynamometer or test stand, the complete engine shall be used with all accessories which might reasonably be expected to influence emissions to the atmosphere installed and functioning but excluding auxiliary gearbox-mounted components required to drive aircraft systems and service air bleed.

(Secs. 231, 301 of the Clean Air Act, as amended (42 U.S.C. 7571, 7601, formerly 42 U.S.C. 1857f-9, 1857 g))

[39 FR 19090, July 17, 1973, as amended at 45 FR 1421, Jan. 7, 1980]

§ 87.61 Turbine fuel specifications.

For exhaust emission testing, fuel meeting the specifications, ASTM D1655-latest version-Jet A, shall be used. Nonmetallic additives as specified in ASTM D1655-latest version-Jet A, may be present. Additives used for the purpose of smoke suppression (such as organo-metallic compounds) shall not be present.

§ 87.62 Test procedure (propulsion engines).

(a)(1) The engine shall be tested in each of the following engine operating modes which simulate aircraft operation to determine its mass emission rates.

Actual power setting, that when corrected to standard day conditions, corresponds to the following percentage of rated power (rated power includes the reheat contribution and thrust augmentation due to water injection, if applicable):

Mode	Class T1 or P2	Class T2, 4T3, or T4	Class T5
Taxi/idle (out)	(1)	(1)	(1)
Takeoff	100	100	100
Climbout	90	85	65
Descent	NA	NA	15
Approach	30	30	34
Taxi/idle (in)	(1)	(1)	(1)

[1] See paragraph (a)(2) of this section.

(2) The taxi/idle operating modes shall be carried out at a power setting in accordance with applicable Federal Aviation Administration regulations, at the manufacturer's recommended power setting for idle.

(b) Emission testing shall be conducted on warmed-up engines which have achieved a steady operating temperature.

[38 FR 19090, July 17, 1973, as amended at 41 FR 34725, Aug. 16, 1976]

§ 87.63 [Reserved]

§ 87.64 Sampling and analytical system for measuring exhaust emissions.

(a) *Schematic drawing.* Figure 3 is a schematic drawing of the exhaust gas sampling and analytical system which shall be used for testing under the regulations in this subpart. Additional components such as instruments, valves, solenoids, pumps, and switches may be used to provide additional information and coordinate the functions of the component systems. Parallel installation of CO and CO_2 instruments are an acceptable alternate configuration of Figure 3.

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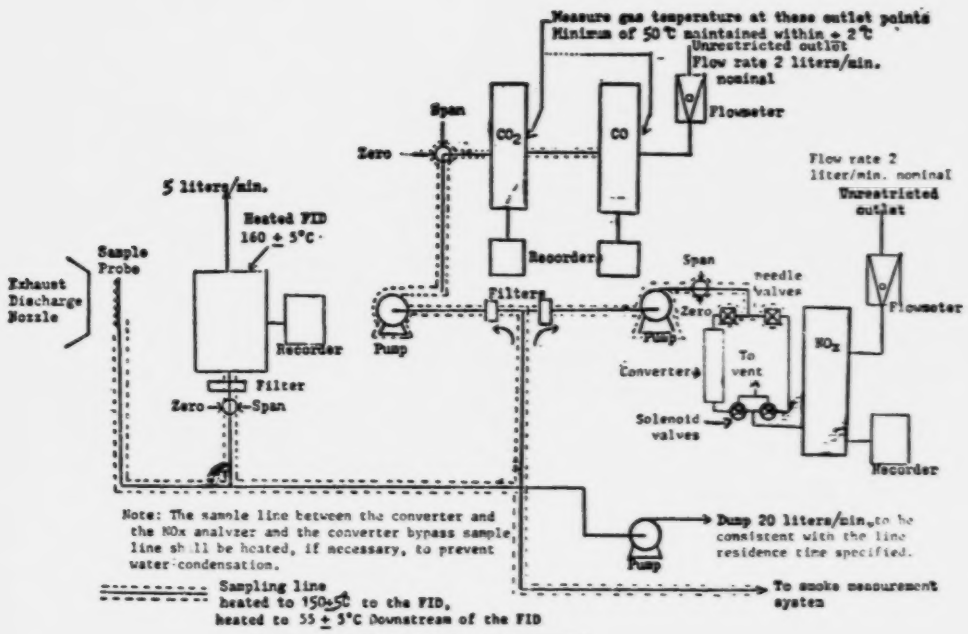

Figure 3. SAMPLING SYSTEM AND INSTRUMENT ARRANGEMENT

(b) *Water removal devices.* No desiccants, dryers, water traps, or related equipment may be used to treat the exhaust sample flowing to the oxides of nitrogen measurement instrumentation. NO_x instrument configuration must be such that condensation is avoided through the instrument. The extent of water vapor and carbon dioxide interference on the carbon monoxide analyzer shall be determined by passing a range of known concentrations of carbon dioxide and water vapor through the instrument and observing the response. If the effect is greater than 2 percent of measured CO levels, all subsequent measurements shall be corrected for these interferences.

(c) *Component description (exhaust gas sampling system).* The following components shall be used in the exhaust gas sampling system for testing under the regulations in this subpart.

(1) *Sampling probe.* (i) Probe design concept: The probe shall be made of stainless steel. If a mixing probe is used, all sampling holes shall be of equal diameter. Total probe orifice area shall be such that the principal pressure drop (at least 80 percent) through the probe assembly shall be taken at the orifice (or orifices).

(ii) Probe orientation and sampling location:

(*a*) A minimum of 12 sampling points shall be used. Either mixing or individual probes are acceptable.

(*b*) A minimum of three different radial positions shall be used in each of four sampling quadrants.

(*c*) If the minimum of 12 sampling points is used, the points in circumferentially adjacent sampling areas shall be separated by at least 80° angular displacement. No two sampling points shall be separated in any direction by a distance less than 0.1 tailpipe radius or 0.1 annular height, as applicable. If the number of sampling points (n) is greater than 12, they shall be equal in number in each quadrant or sector and the minimum separations specified above shall be reduced by a factor = 12/n.

(*d*) The axial sampling plane shall be as close to the plane of the exit nozzle as engine performance parameters permit but in any case, shall be

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within one exit nozzle diameter of the exit plane, except for engine operating modes which employ reheat (afterburning).

(e) In all cases, the probe shall be designed to obtain a representative sample over the area of the entire exhaust nozzle, on both mixed fan engines and nonmixed fan engines as well as turbojets and turboprops.

(f) The multipoint probe shall be designed to minimize the errors due to pollutant stratification, whether the stratification is due to combustor design, mixing or lack of mixing, or engine design such as mixing of fan and core air.

(2) *Sample transfer.* The sample system transport time as measured from the sample probe to the entrance to the instrumentation system must be shown by calculation using the physical characteristics of the sample line to be 2 seconds or less. The sample shall be transferred from the probe to the instrumentation system through a heated sample line of either stainless steel or Teflon of 0.18 to 0.32 in. I.D. The sample lines shall be maintained at a temperature of 150°±5°C.

(3) *Sample line length.* The sample line length from the probe exit to the instrumentation system shall be of minimum length, but in no case greater than 80 feet.

(d) *Component description (exhaust gas analytical system).* The following components shall be used in the exhaust gas analytical system for testing under the regulations in this subpart. The analytical system provides for the determination of hydrocarbon concentrations by flame ionization detector analysis, the determination of carbon monoxide and carbon dioxide concentrations by nondispersive infrared analysis and the determination of oxides of nitrogen concentrations by chemiluminescence analysis of exhaust samples. The chemiluminescence method of analysis requires that the nitrogen dioxide present in the sample be converted to nitric oxide before analysis. Other types of analyzers may be used if shown to yield equivalent results and if approved in advance by the Administrator. See Appendix A of this part.

(Secs. 231, 301 of the Clean Air Act, as amended (42 U.S.C. 7571, 7601, formerly 42 U.S.C. 1857f-9, 1857 g))

[38 FR 19090, July 17, 1973, as amended at 38 FR 34734, Dec. 18, 1973; 41 FR 34725, Aug. 16, 1976; 41 FR 39746, Sept. 16, 1976; 45 FR 1421, Jan 7, 1980]

§ 87.65 Information to be recorded.

The following information, as applicable, shall be recorded with respect to each test.

(a) *General.* (1) Facility performing test.

(2) Description of test equipment including the probe and sampling and analytical train.

(3) Instrument operator.

(4) Test stand operator.

(5) Fuel identification, including H/C ratio and additives, if any.

(b) *Aircraft (in which engine will be installed) description.* (1) Manufacturer.

(2) Model number.

(3) Serial number (if known).

(4) User.

(5) Engine installation position.

(c) *Engine description.* (1) Manufacturer.

(2) Model number.

(3) Serial number.

(4) Time since overhaul and other pertinent maintenance information.

(d) *Test data.* (1) Test number.

(2) Date.

(3) Time.

(4) Ambient temperature and engine inlet temperature.

(5) Barometric pressure.

(6) Absolute humidity.

(7) Sample line temperature. Line temperature shall be taken at a minimum of three locations, two of which shall be the probe outlet and instrumentation inlet.

(8) Sample system transport time. (i) Test date.

(ii) Supporting calculations.

(9) All pertinent instrumentation information such as tuning, gain, full scale range.

(10) Recorder charts: Identify zero, span, exhaust gas sample traces, and operating mode.

(11) Date of most recent analytical assembly calibration and identification number, if any.

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(12) CO, CO_2, HC, and NO_x emission measurement system response time for the current and previous test. Record test date and test number of previous test.

(e) *Operating mode data.* (1) Nominal power setting.

(2) Actual power setting (pounds, thrust, horsepower, etc.).

(3) N_1 speed, revolutions per minute.

(4) N_2 speed and N_3, if applicable, revolutions per minute.

(5) Measured fuel flow, pounds/hour.

(6) Air flow, pounds/second and method of determination.

(7) PT_7.

(8) EPR.

(9) TT_7.

(10) Pollutant concentration, from recorders, in percent or parts per million by volume, and parts per million carbon for hydrocarbons.

(Secs. 231, 301 of the Clean Air Act, as amended (42 U.S.C. 7571, 7601, formerly 42 U.S.C. 1857f-9, 1857 g))

[38 FR 19090, July 17, 1973, as amended at 41 FR 39746, Sept. 16, 1976; 45 FR 1421, Jan. 7, 1980]

§ 87.66 Calibration and instrument checks.

(a) Calibrate the analytical assembly at least once every 30 days. Use the same flow rate as when analyzing samples.

(1) Adjust analyzers to optimize performance.

(2) Zero the hydrocarbon analyzer with zero grade air and the carbon monoxide, carbon dioxide, and oxides of nitrogen analyzers with zero grade nitrogen. The allowable zero gas impurity concentrations should not exceed 0.1 p.p.m. equivalent carbon response, 1 p.p.m. carbon monoxide, 350 p.p.m. carbon dioxide, and 0.1 p.p.m. nitric oxide.

(3) Set the CO and CO_2 analyzer gains to give the desired range. Select desired attenuation scale of the HC analyzer and adjust the electronic gain control to give the desired full scale range. Select the desired scale of the NO_x analyzer and adjust the prototube high voltage supply or amplifier gain to give the desired range.

(4) Calibrate the HC analyzer with propane (air diluent) gases having nominal concentrations equal to 50 and 95 percent of full scale of each range used. Calibrate the CO analyzer with carbon monoxide (nitrogen diluent) gases and the CO_2 analyzer with carbon dioxide (nitrogen diluent) gases having nominal concentrations equal to 30, 60, and 90 percent of full scale of each range used. Calibrate the NO_x analyzer with nitric oxide (nitrogen diluent) gases having nominal concentrations equal to 50 and 95 percent of full scale of each range used. The actual concentrations should be known to within ±2 percent of the true values.

(5) Compare values obtained on the CO and CO_2 analyzers with previous calibration curves. Any significant change reflects some problem in the system. Locate and correct problem, and recalibrate. Use best judgment in selecting curves for data reduction. Log gain reading.

(6) Check the NO_x to NO converter efficiency by the following procedure. Use the apparatus described and illustrated in Figure 4.

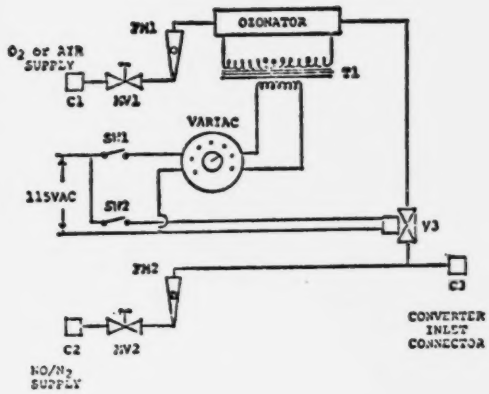
(i) Attach the NO/N_2 supply (150-250 p.p.m.) at C2, the O_2 supply at C1 and the analyzer inlet connection to the efficiency detector at C3. If lower concentrations of NO are used, air may be used in place of O_2 to facilitate better control of the NO_2 generated during step (iv).

(ii) With the efficiency detector variac off, place the NO_x converter in bypass mode and close valve V3. Open valve MV2 until sufficient flow and stable readings are obtained at the analyzer. Zero and span the analyzer output to indicate the value of the NO concentration being used. Record this concentration.

(iii) Open valve V3 (on/off flow control solenoid valve for O_2) and adjust valve MV1 (O_2 supply metering valve) to blend enough O_2 to lower the NO concentration (ii) about 10%. Record this concentration.

(iv) Turn on the ozonator and increase its supply voltage until the NO concentration of (iii) is reduced to about 20% of (ii). NO_2 is now being formed from the $NO+O_3$ reaction. There must always be at least 10% unreacted NO at this point. Record this concentration.

Figure 4 — NO_x CONVERTER EFFICIENCY DETECTOR



(v) When a stable reading has been obtained from (iv), place the NO_x converter in the convert mode. The analyzer will now indicate the total NO_x concentration. Record this concentration.

(vi) Turn off the ozonator and allow the analyzer reading to stabilize. The mixture $NO+O_2$ is still passing through the converter. This reading is the total NO_x concentration of the dilute NO span gas used at step (iii). Record this concentration.

(vii) Close valve V3. The NO concentration should be equal to or greater than the reading of (ii) indicating whether the NO contains any NO_2.

Calculate the efficiency of the NO_x converter by substituting the concentrations obtained during the test into the following equation.

$$\% \text{ Eff.} = v) - (iv)/(vi) - (iv) \times 100\%$$

The efficiency of the converter should be greater than 90 percent. Adjusting the converter temperature may be needed to maximize the efficiency. Efficiency checks should be made on each analyzer range using an NO span gas concentration appropriate to the instrument range.

(viii) If the converter efficiency is not greater than 90 percent, the cause of the inefficiency shall be determined and corrected before the instrument is used.

(ix) The converter efficiency shall be checked at least once weekly and preferably once daily.

(b) Verifications and instrument checks shall be performed in accordance with § 87.67 on in-use systems. Verification and instrument checks shall be performed before and after each test, but not less than once per hour.

(c) For the purposes of this section, the term "zero grade air" includes artificial "air" consisting of a blend of nitrogen and oxygen with oxygen concentrations between 18- and 21-mole percent.

[38 FR 19090, July 17, 1973, as amended at 38 FR 34734, Dec. 18, 1973]

§ 87.67 Sampling procedures.

(a) *HC, CO, CO_2, and NO_x measurements.* Allow a minimum of 2 hours warmup for the CO, CO_2, HC, and NO_x analyzers. (Power is normally left on infrared and chemiluminescence analyzers; but when not in use, the chopper motors of the infrared analyzers are turned off and the phototube high voltage supply of the chemiluminescence analyzer is placed in the standby position.) The following sequence of operations shall be performed in conjunction with each series of measurements:

(1) Check the sampling system for any leaks that could dilute the exhaust gas and replace or clean sample line filters.

(2) Introduce the zero grade gas at the same flow rates used to analyze the test samples and zero the analyzers. Obtain a stable zero on each amplifier meter and recorder. Recheck after tests.

(3) Introduce span gases and set the CO and CO_2 analyzer gains, the HC analyzer sample capillary flow rate and electronic gain control, if provided, and the NO_x analyzer high voltage supply or amplifier gain to match the calibration curves. In order to avoid corrections, span and calibrate at the same flow rates used to analyze the test samples. Span gases should have concentrations equal to approximately 80 percent of each range used. If gain has shifted significantly on the CO or CO_2 analyzers, check tuning. If

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necessary, check calibration. Respan at least at end of test but not less than once per hour. Show actual concentrations on chart. Log gain readings.

(4) Check zeros; repeat the procedure in paragraphs (a)(1) and (2) of this section, if required.

(5) Check the sample system line temperature. Also check the emission measurement system response time using the following procedure:

(i) In addition to the requirements of § 87.64, the sample system transport time shall be rechecked each time the emission measurement system is modified in any manner which may reasonably be expected to change the sample system transport time.

(ii) The emission measurement system response time shall be checked. Introduce an HC span gas at the sample probe and measure the time it takes for the instrument to respond to 15% of span concentration. The emission measurement system response time shall be 7 seconds or less.

(iii) Repeat (ii) for the CO, CO_2, and NO_x instrumentation. The emission measurement system response time for all instruments shall be 7 seconds or less except for the NO_x chemiluminescence instrument which shall have a response time of 9 seconds or less.

(iv) The results of paragraphs (a)(5)(ii) and (iii) of this section must compare with the emission measurement system response times of the previous test within ±1.0 second.

(6) Check instrument flow rates and pressures.

(7) The engine shall be operated in each operating mode until emission levels have stabilized as indicated by a constant instrument reading or recorder output. This stabilized reading shall be recorded and used in calculating mass emission rates as called for in § 87.70.

(8) Measure, HC, CO, CO_2, and NO_x concentrations of the exhaust sample at the various modes called for in §§ 87.62 or 87.63, as appropriate.

(9) If individual probes are used, the number to be reported (for each component) shall be the arithmetic average of the values obtained at each sampling point. If mixing probes are used, the number to be reported shall be the average of the values of the several probes, giving each probe a weighting factor equal to the number of sample points in that particular probe.

(10) Recheck zero and span points at the end of the test and also at approximately one hour intervals during the test. If either has changed by ±2 percent of full scale, the test shall be rerun after instrument maintenance: *Provided,* That if it is impractical to repeat the test, a correction based on an interpolation which is linear with time is acceptable for corrections within ±4 percent.

(b) *Sample system contamination.* (1) Care shall be taken to avoid loading of the sampling system with raw fuel discharge during engine starting.

(2) When the sample probe is in the exhaust stream and sampling is not in process, a back purge with air or an inert gas may be necessary to protect the probe and sample line from particulate buildup which could affect smoke and hydrocarbon readings. Check sample line for contamination each time the instrument zero and span points are checked. Use the following procedure to check the sample line:

(i) Immediately after instrument zero and span measurements and necessary adjustments are complete, introduce hydrocarbon zero gas near the sample probe. If the instrument zero reading increases by more than 5 percent of the scale in use, the sample line shall be purged or cleaned as required, to bring the zero within limits.

(ii) When the requirements of (i) have been met, introduce hydrocarbon span gas into the inlet of the sampling system. If the instrument span reading is different by more than ±5 percent from the correct setting for the scale in use, the sample line shall be purged or cleaned, as required, to bring the span within limits.

[38 FR 19090, July 17, 1973, as amended at 41 FR 39746, Sept. 16, 1976]

§ 87.68 Test run.

A test run shall consist of operating the engine in accordance with §§ 87.62 or 87.63, as applicable. During the test run the engine shall not be operated

at a power setting above normal idle power before beginning the test sequence of § 87.62. The engine shall be operated in the sequence called for under these sections, unless an alternate procedure is agreed to in writing by the Administrator before such testing is conducted. If repeat runs at full takeoff power are necessary, they may be conducted after the last idle run in the test sequence.

§ 87.69 Chart reading.

Determine the HC, CO, CO_2, and NOx concentrations of the exhaust sample during the various modes from the instrument deflections or recordings, making use of appropriate calibration charts.

§ 87.70 Calculations.

(a) The final reported test results shall be computed by use of the following formulas:

(1) Hydrocarbon:

HC pounds/1,000 pound-thrust-hrs. or 1,000 hp.-hr., as appropriate/cycle = Sum of the HC mass/mode of ea. mode/Sum of the work output of ea. mode

(2) Carbon monoxide:

CO pounds/1,000 pound-thrust hrs. or 1,000 hp.-hr., as appropriate/cycle = Sum of the CO mass/mode of ea. mode/Sum of the work output of ea. mode

(3) Oxides of nitrogen:

NO_x pounds/1,000 pound-thrust hrs. or 1,000 hp.-hr., as appropriate/cycle = Sum of the NO_x mass/mode of ea. mode/Sum of the work output of ea. mode

(b) The pollutant mass and work output per mode shall be computed by use of the following formulas:

(1) HC mass/mode = HC emission rate × TIM.

(2) CO mass/mode = CO emission rate × TIM.

(3) NO_x mass/mode = NO_x emission rate × TIM.

(4) Work output of each mode = power (in 1,000 pounds of thrust or 1,000 horsepower) × TIM.

(c) The emission rates for each mode shall be computed by use of the following formulas:

$$\text{(1) HC emission rate} = \frac{M_{HC}\frac{(HC)}{10^4}F}{(M_C + {}_eM_H)\left(\frac{(CO)}{10^4} + (CO_2) + \frac{(HC)}{10^4}\right)}$$

$$\text{(2) CO emission rate} = \frac{M_{CO}\frac{(CO)}{10^4}F}{(M_C + {}_eM_H)\left(\frac{(CO)}{10^4} + (CO_2) + \frac{(HC)}{10^4}\right)}$$

$$\text{(3) } NO_x \text{ emission rate} = \frac{M_{NO_2}\frac{(NO_x)}{10^4}F}{(M_C + {}_eM_H)\left(\frac{(CO)}{10^4} + (CO_2) + \frac{(HC)}{10^4}\right)}$$

(d) The time in mode (TIM) shall be as specified below:

Times in mode (minutes)	Class T1 or P2	Class T2, T3, or T4	Class T5
(1) Taxi/idle (out)	19.0	19.0	19.0
(2) Takeoff	.5	.7	1.2
(3) Climbout	2.5	2.2	2.0
(4) Descent	NA	NA	1.2
(5) Approach	4.5	4.0	2.3
(6) Taxi/idle (in)	7.0	7.0	7.0

(e) Meaning of symbols:

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(1)(i) HC mass/mode = Total mass of hydrocarbon emissions in pounds emitted during an operational mode as specified in § 87.62 and paragraph (d) of this section.

(ii) CO mass/mode = Total mass carbon monoxide emissions in pounds emitted during an operational mode as specified in § 87.62 and paragraph (d) of this section.

(iii) NO_x mass/mode = Total mass of oxides of nitrogen emissions in pounds emitted during an operational mode as specified in § 87.62 and paragraph (d) of this section.

(2)(i) HC emission rate = Pounds/hour of exhaust hydrocarbons emitted in an operational mode.

(ii) CO emission rate = Pounds/hour of exhaust carbon monoxide emitted in an operational mode.

(iii) NO_x emission rate = Pounds/hour of exhaust oxides of nitrogen emitted in an operational mode.

(3)

(i) M_{hc} = Molecular weight of methane, $M_{hc} = 16.04$.

(ii) M_{co} = Molecular weight of carbon monoxide.

(iii) M_{no2} = Molecular weight of nitrogen dioxide.

(iv) M_c = Atomic weight of carbon.

(v) M_h = Atomic weight of hydrogen, $M_h = 1.008$.

(vi) a = Atomic hydrogen-carbon ratio of fuel.

(4) For each operating mode:

(i) (HC) = Concentration of hydrocarbons in the exhaust sample in parts per million carbon equivalent, i.e., equivalent propane × 3.

(ii) (CO) = Concentration of carbon monoxide in the exhaust sample in parts per million by volume.

(iii) (CO_2) = Concentration of carbon dioxide in the exhaust sample in volume percent.

(iv) (NO_x) = Concentration of oxides of nitrogen in the exhaust sample in parts per million by volume, $NO + NO_2$.

(v) F = Mass rate of fuel flow in pounds per hour.

(5) TIM = Time in mode as specified in paragraph (d) of this section, divided by 60 to yield time in mode in hours.

[38 FR 19090, July 17, 1973; 38 FR 34734, Dec. 18, 1973, as amended at 41 FR 34725, Aug. 16, 1976; 41 FR 39746, Sept. 16, 1976]

§ 87.71 Compliance with emission standards.

Compliance with each emission standard by any aircraft or aircraft engine shall be determined by comparing the pollutant level in pounds/1,000 pound-thrust hours/cycle or pounds/1,000 hp.-hr./cycle as calculated in § 87.70(a) with the applicable emission standard under this part. The pollutant level for the cycle shall not exceed the standard.

Subpart H—Test Procedures for Engine Smoke Emission (Aircraft Gas Turbine Engines)

§ 87.80 Introduction.

Except as provided under § 87.5, the procedures described in this subpart shall be the test program to determine the conformity of new and in-use gas turbine engines with the applicable standards set forth in this part. The test is essentially the same as that described in §§ 87.60-87.62, except that the test is designed to determine the smoke emission level at various operating points representative of engine usage in aircraft. Other smoke measurement systems may be used if shown to yield equivalent results and if approved in advance by the Administrator.

§ 87.81 Fuel specifications.

Fuel having specifications as provided in § 87.61 shall be used in smoke emission testing.

§ 87.82 Sampling and analytical system for measuring smoke exhaust emissions.

(a) *Schematic drawing.* Figure 5 is a schematic drawing of the exhaust smoke sampling and analytical system which shall be used in testing under the regulation in this subpart.

(b) *Component description.* The following components shall be used in the sampling and analytical system for testing under the regulations in this subpart.

(1) *Sample size measurement.* A wet or dry positive displacement meter shall be used to measure sample size to an accuracy of ±0.01 standard cubic

foot. Pressure and temperature shall be measured immediately upstream of the meter. Accuracy shall be no less than ±0.10 in. Hg and ±4° F., respectively. If a dry type meter is used, it may be located between the filter holder and the vacuum pump.

(2) *Sample flow rate measurement.* Sample flow rate shall be measured with a rotameter with accuracy of no less than ±0.02 cubic foot per minute.

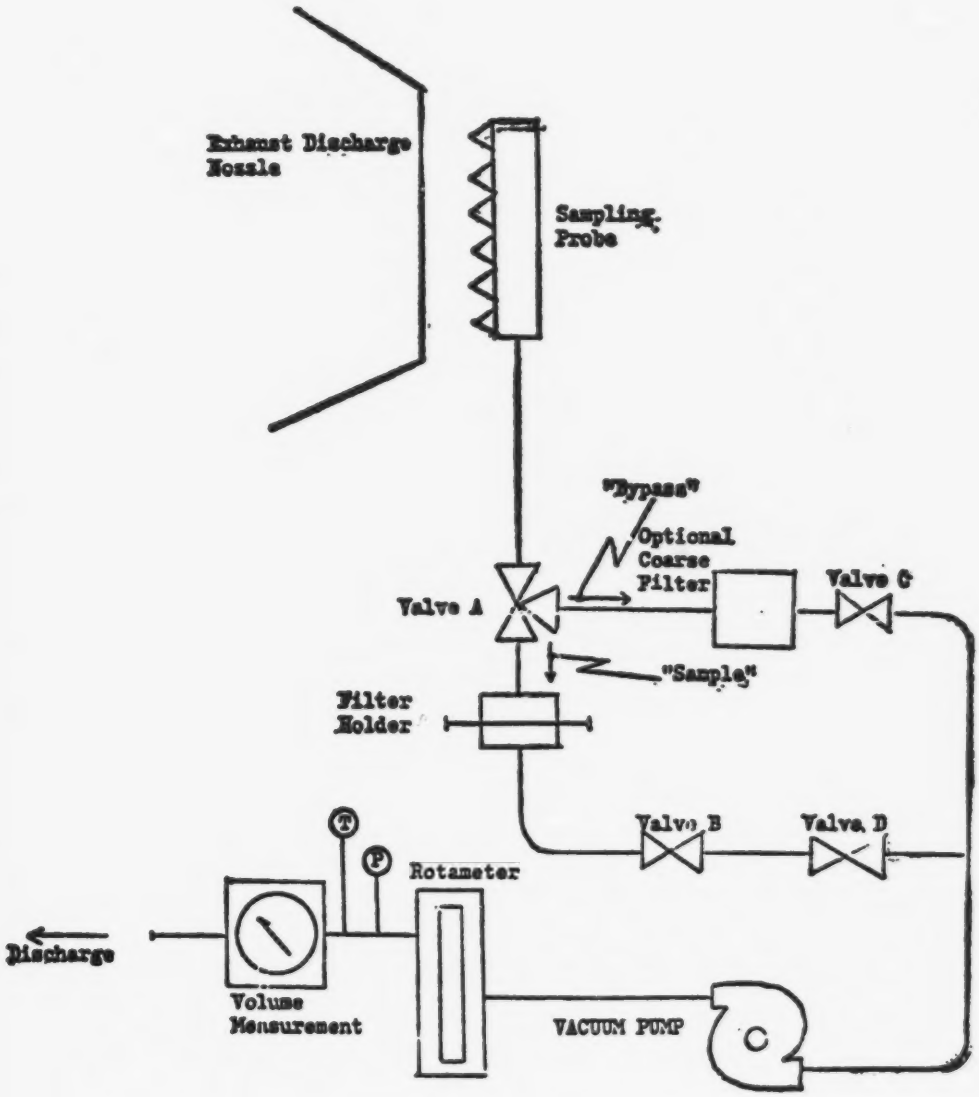

Figure 5 - SAMPLING SYSTEM SCHEMATIC DIAGRAM

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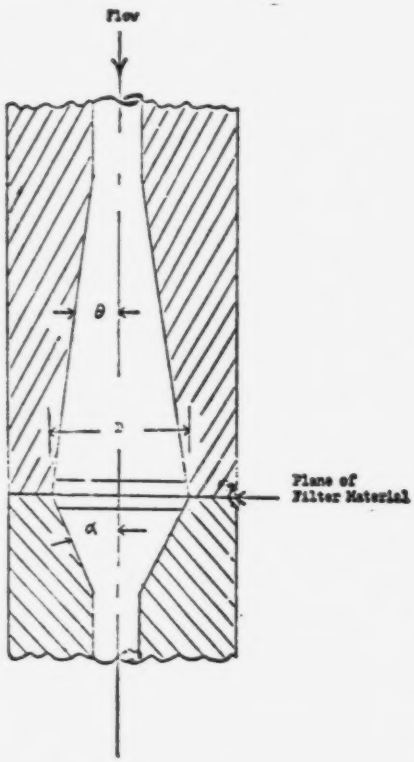
(3) *Filter holder.* The filter holder shall firmly clamp the filter material so that overall system leakage does not exceed that provided in § 87.84(c). The holder internal geometry shall be such that the variation of SN over the sample spot surface is not greater than two. Required elements of the filter holder design are given in Figure 6. The filter holder shall be made of corrosion resistant material.

(4) *Sampling probe.* The sample probe and procedure shall be the same as used to show compliance with § 87.64(c).



D (Spot diameter) = 0.50 to 1.50 in.
θ = 5° to 7.5°
α = 20° to 30°

Figure 6 - FILTER HOLDER SCHEMATIC DIAGRAM

(5) *Sampling lines.* The sampling lines shall be straight through with no kinks or loops, and no bends having a radius of less than 10 line diameters. Sampling line inside diameter shall be within 0.18 to 0.32 inch. The sampling line section from the probe exit to valve A entrance shall be of minimum length, not greater than 75 feet, with a minimum of fittings or other breaks. Line material shall be such as to not encourage build-up of either particulate matter or static electric charge, such as stainless steel or copper.

(6) *Valving.* Four valve elements shall be provided. Valve A shall be a quick acting, full-flow, flow diverter with "closed," "sample," and "bypass" positions. Valve A may consist of two valves, provided that they are interlocked so that one of the pair cannot act independently of the other. Valves B and C shall be throttling valves used to establish a system flow rate. Valve D shall be a shutoff valve used in isolating the filter holder. All valves shall be made of corrosion resistant material.

(7) *Vacuum pump.* The vacuum pump shall have a no-flow vacuum capability of at least 22 in. Hg. V., and full-flow capacity of 1 s.c.f.m. minimum.

(8) *Reflectometer.* A reflectometer conforming to ASA standard for diffuse reflection density, number Ph2.17-1958, shall be used. The diameter of the reflectometer light beam on the filter paper shall be no more than one-half of "D," the diameter of the filter spot. The allowable range of "D" is given in Figure 6.

(9) *Filter material.* The filter material shall be Whatman No. 4 filter paper or equivalent approved by the Administrator.

§ 87.83 Information to be recorded.

The following information shall be recorded with respect to each test in addition to that information called for in § 87.65(a) through (c).

(a) Sample temperature.

(b) Sample pressure.

(c) Actual sample volume at sampling conditions.

(d) Actual sample flow rate at sampling conditions.

(e) Leak and cleanliness checks substantiation as required by § 87.84 (b) and (c).

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§ 87.84 Calibration and instrument checks.

(a) *Reflectometer calibration.* The reflectometer required by § 87.82(b)(8) shall be calibrated in accordance with manufacturer's specifications.

(b) *System maintenance.* The need for cleaning or replacement shall be determined by conducting the following cleanliness check:

(1) Full open valves B, C, and D.

(2) Use the vacuum pump and alternately set valve A to "bypass" and "sample" to purge the entire system with clean air for at least 5 minutes.

(3) Set valve A to "bypass."

(4) Close valve D and clamp clean filter material into the holder. Open valve D.

(5) Set valve A to "sample," reset back to "bypass" after 1 standard cubic foot of air per square inch of filter area has passed through the filter material.

If the filter spot exhibits SN greater than 3, the system lines must be cleaned or replaced. The system shall not be used until this cleanliness requirement has been met.

(c) *Leak check.* The following procedure shall be used to leak check the system.

(1) Clamp clean filter material into the holder.

(2) Close valve A, full open valves B, C, and D.

(3) Run the vacuum pump for 5 minutes.

The system shall be satisfactory if no more than 0.20 standard cubic foot passed through the volume meter during 5 minutes. The system shall not be used until this requirement has been met.

§ 87.85 Test procedures.

(a) The engine shall be operated as provided in § 87.62. The leak check and cleanliness check requirements of § 87.84 shall be confirmed before and after each engine test. The test shall be repeated if the requirements of § 87.84 are not confirmed.

(b) Precautions: The material being measured is composed of low-micron and/or submicron size agglomerated particles. Precautions should be taken to assure that steady state conditions have been achieved prior to taking a sample. To prevent material accumulation, the system shall not be left in a no-flow condition when exhaust gas is contained.

(c) Sampling: Not less than 1 minute shall be allowed to assure that the system is fully charged with a representative gas sample. The sampling flow rate shall be maintained at 0.50 ± 0.02 c.f.m. At least four sample sizes shall be taken within the range of 0.00765 to 0.115 lb. of exhaust gas per square inch of filter. Samples shall be taken both above and below 0.0230 lb. of exhaust gas per square inch of filter.

(d) Temperature control: The gas temperature from the sampling probe entrance to the filter material shall be above the dew point temperature. All lines and valves shall be lagged and/or heated as necessary to meet this requirement.

(e) Preparation for each power setting: The following shall be done to prepare the system at each power setting:

(1) Set valve A to "bypass," close valve D.

(2) Draw exhaust gas for 5 minutes minimum, then use valve C to set flow rate at 0.50 ± 0.02 c.f.m.

(3) Clamp clean filter material into the holder.

(4) Open valve D.

(5) Set valve A to "sample" and use valve B to again set the flow rate to 0.50 ± 0.02 c.f.m. This shall be done quickly before particulate buildup on the filter causes excessive pressure drop.

(6) Set valve A to "bypass" and close valve D.

(7) Clamp clean filter material into the holder.

(f) Sampling procedure: The procedure for smoke sampling at each power setting shall be as follows:

(1) With valve D closed and valve A set at the "bypass" position, charge the lines with exhaust gas for 1 minute minimum. Reestablish flow rate at 0.50 ± 0.02 c.f.m. as required, using valve C.

(2) Open valve D.

(3) Set valve A to "sample," allow the chosen sample volume to pass, then set valve A to "bypass."

(4) Close valve D and clamp clean filter material into the holder.

(5) Repeat paragraphs (f)(2) through (4) of this section for at least three more sample sizes in accordance with paragraph (c) of this section.

§ 87.86 Test run.

With respect to engine operation, the test run shall be conducted in accordance with § 87.68.

§ 87.87 Determination of SN.

Smoke spot analysis shall be made with a reflectometer as specified in § 87.82(b)(8). The backing material shall be black with a maximum absolute reflectance of 3 percent. The reflectance reading of each spot shall be used to calculate SN by:

$$SN = 100(1 - Rs/Rw)$$

where:

RS = absolute reflectance of the sample spot.

Rw = absolute reflectance of clean filter material.

§ 87.88 Calculations.

(a) *Calculation of W.* The sample weight (W) shall be calculated by:

$$W\ (lb.) = 1.326PV/T$$

where

P and T are sample pressure and temperature in units of inches of mercury absolute and degrees Rankine, respectively, measured immediately upstream of the volume meter. V is measured sample volume in cubic feet.

(b) *Calculation of W/A.* The sample weight in pounds per square inch of filter spot area (W/A) shall be calculated for each sample size taken.

(c) *Plotting SN versus W/A.* All SN shall be plotted versus W/A on semi-log coordinates, with W/A as the logarithmic abscissa. A straight line shall be fitted to these points using the method of least squares. Such a line shall be produced for each power setting specified.

(d) *Plotting reporting values of SN versus power setting.* Values of SN shall be read from the straight line functions of paragraph (c) of this section for W/A = 0.0230 lb/sq. in. These SN are the values to be reported and shall be presented by plotting them as ordinate versus power setting as abscissa on rectangular coordinates.

§ 87.89 Compliance with emission standards.

Compliance with each emission standard shall be determined by comparing the plot of SN versus power setting from § 87.88 with the applicable emission standard under this part. The SN at every power setting shall not exceed the standard.

Subpart I—[Reserved]

Subpart J—Temporary Exemption From Aircraft Emission Standards (Fuel Venting and Smoke)

§ 87.101 Application for temporary exemption.

(a) The Administrator of the Environmental Protection Agency may grant to any aircraft or aircraft engine temporary exemption from any applicable standard under § 87.11(a), § 87.31(a), or § 87.31(c), provided that the owner or operator of such aircraft or aircraft engine demonstrates:

(1) All good faith efforts to achieve compliance with such standard,

(2) Inability to comply with such standard due to circumstances beyond his control, and

(3) A plan by which he will achieve such compliance in the shortest time which is feasible.

(b) Applications for temporary exemptions from the requirements of § 87.31(a) or § 87.31(c) shall be submitted in duplicate to the Administrator of the Environmental Protection Agency and shall contain the following information:

(1) The name and address of the applicant,

(2) The standard or requirement from which temporary exemption is requested,

(3) The number of aircraft or aircraft engines subject to the requirement for which a temporary exemption is requested,

(4) The efforts made by the applicant to accomplish compliance, including ordering of equipment and scheduling of maintenance work, and the dates of these efforts,

(5) A detailed statement of reasons why the applicant will not be in compliance when the standard or requirement becomes effective,

(6) The name of the equipment supplier and/or the name of the firm retained to perform the maintenance work,

(7) The applicant's proposed timetable for installation of equipment and obtaining necessary approvals for each aircraft or aircraft engine for which temporary exemption is requested, and

(8) The name of the person responsible for accomplishing compliance according to the timetable proposed by the applicant.

(c) Prior to taking action on an application for temporary exemption, the Administrator shall consult with the Secretary of Transportation. A copy of the applicant's request should be submitted by the applicant to the Secretary of Transportation.

(d) The Administrator shall publish in the FEDERAL REGISTER the name of the owner or operator to whom a temporary exemption is granted and the period of such exemption.

(e) No state or political subdivision thereof may attempt to enforce a standard respecting fuel venting or smoke emissions from an aircraft or engine if such aircraft or engine has been granted an exemption from such standard.

(Secs. 231, 301(a), Clean Air Act, as amended (42 U.S.C. 7571, 7601(a)))

[38 FR 35001, Dec. 21, 1973, as amended at 46 FR 2045, Jan. 8, 1981]

§ 87.102 Thirty-day suspension of fuel venting and smoke standards.

(a) The applicability of the standards of § 87.11(a) and § 87.31(a) to aircraft subject to such standards is suspended until February 1, 1974.

(b) Application for temporary exemption from the standards of § 87.11(a) and § 87.31(a) for aircraft which will not be in compliance by February 1, 1974, must be submitted in accordance with the procedures of § 87.101.

(c) The applicability of the standards of § 87.31(c) to aircraft subject to such standards is suspended until February 1, 1981.

(d) Application for temporary exemption from the standards of § 87.31(c) for aircraft which will not be in compliance by February 1, 1981, must be submitted in accordance with the procedures of § 87.101.

(Secs. 231, 301(a), Clean Air Act, as amended (42 U.S.C. 7571, 7601(a)))

[38 FR 35001, Dec. 21, 1973, as amended at 46 FR 2045, Jan. 8, 1981]

APPENDIX A—INSTRUMENTATION (AIRCRAFT GAS TURBINE ENGINE MEASUREMENTS)

(a) *NDIR instruments.* Nondispersive infrared (NDIR) analyzers shall be used for the continuous monitoring of carbon monoxide and carbon dioxide.

The NDIR instruments operate on the principle of differential energy absorption from parallel beams of infrared energy. The energy is transmitted to a differential detector through parallel cells, one containing a reference gas, and the other, sample gas. The detector, charged with the component to be measured, transduces the optical signal to an electrical signal. The electrical signal thus generated is amplified and continuously recorded. The NDIR analyzer used in accordance with Subpart H of this part shall meet the following specifications:

(1) *Response time (electrical).* 90 percent full scale response in 0.5 second or less. Zero drift—Less than ±1 percent of full scale in 2 hours on most sensitive range. Span drift—Less than ±1 percent of full scale in 2 hours on most sensitive range. Repeatability—±1 percent of full scale. Noise—Less than 1 percent of full scale on most sensitive range. Cell temperature—Minimum 50° C. maintained within ±2° C.

(2) *Range and accuracy.*

Range	Accuracy excluding interferences
Carbon monoxide:	
0 to 100 p.p.m.	±2 percent of full scale.
0 to 500 p.p.m.	±1 percent of full scale.
0 to 2500 p.p.m.	±1 percent of full scale.
Carbon dioxide:	
0 to 2 percent	±1 percent of full scale.
0 to 5 percent	±1 percent of full scale.

(3) All NDIR instruments shall be equipped with cells of suitable length to measure exhaust concentrations within the ranges encountered to the indicated accuracy. Range changes shall be accomplished either by the use of stacked sample cells or changes in the electronic circuitry, or both.

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(b) *Total hydrocarbon analyzer* (1) General design specifications. The measurement of total hydrocarbon is made by an analyzer using a flame ionization detector (FID). With this type detector an ionization current, proportional to the mass rate of hydrocarbon entering a hydrogen flame, is established between two electrodes; the small current is measured by an electrometer amplifier and continuously recorded.

The analyzer shall be fitted with a constant-temperature oven housing the detector and sample-handling components. It shall maintain temperature within ±2° C. of the set point, which shall be within 155° to 165° C.

The detector and sample handling components shall be suitable for continuous operation at temperatures to 200° C.

(2) The FID analyzer used in accordance with Subpart G of this part shall meet the following specifications:

Response time (electrical)—90 percent of full scale in 0.5 seconds or less.

Noise—±1 percent of full scale on most sensitive range.

Repeatability—±1 percent of full scale.

Zero drift—Less than ±1 percent of full scale in 2 hours on all ranges.

Span drift—Less than ±1 percent of full scale in 2 hours.

Linearity—Response with propane in air shall be linear with ±2 percent over the range of 0 to 2,000 p.p.m.C.

Accuracy:

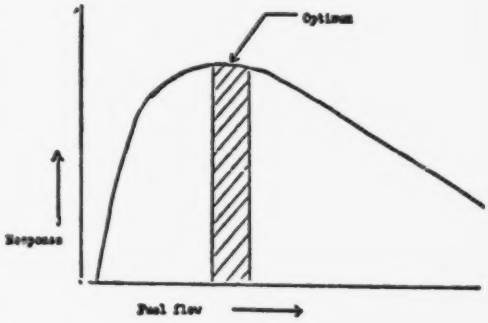
Range	Accuracy
0 to 10 p.p.m.C	±5 percent of full scale with propane calibration gas.
0 to 100 p.p.m.C	±2 percent of full scale with propane calibration gas.
0 to 1,000 p.p.m.C	±1 percent of full scale with propane calibration gas.
0 to 2,000 p.p.m.C	±1 percent of full scale with propane calibration gas.

(3) Total hydrocarbon analyzer shall have an initial alignment as follows:

(i) *Optimization of detector response.* (*a*) Follow manufacturer's instructions for instrument startup and basic operating adjustment. Fuel shall be 60 percent helium, 40 percent hydrogen containing less than 2 p.p.m.C. hydrocarbon. Air shall be "hydrocarbon-free" grade containing less than 2 p.p.m.C.

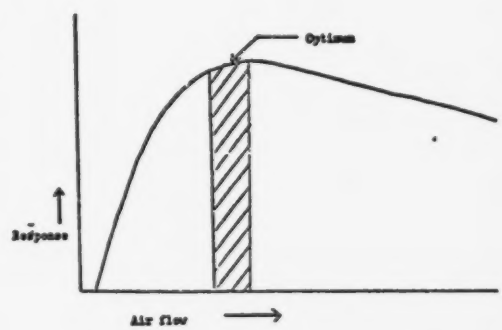
(*b*) Set oven temperature at 160° ± 5°C. and allow at least one-half hour after oven reaches temperature for the system to equilibrate. The temperature is to be maintained at set point ± 2°C.

(*c*) Introduce a mixture of propane in air at a propane concentration of about 500 p.p.m.C. Vary the fuel flow to burner and determine the peak response. A change in zero may result from a change in fuel flow; therefore, the instrument zero should be checked at each fuel-flow rate. Select an operating flow rate that will give near maximum response and least variation in response with minor fuel-flow variations. A typical curve for response versus fuel flow is shown in the following figure.



RESPONSE VS. FUEL FLOW

(*d*) To determine the optimum air flow, use fuel flow setting determined above and vary air flow. A typical curve for response versus air flow is shown in the following figure:



RESPONSE VS. AIR FLOW

After the optimum flow settings have been determined these flows are to be measured and recorded for future reference.

(ii) *Oxygen effect.* Check the response of the detector with varied concentrations of oxygen in the sample following the steps outlined below; this test shall be made with oven temperature at the set point and with gas flow to the detector at optimum conditions, as determined in paragraph (b)(3)(i) of this appendix.

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(*a*) Introduce nitrogen (N_2) zero gas and zero analyzer; check zero using hydrocarbon-free air; the zero should be the same.

(*b*) The following blends of propane shall be used to determine the effect of oxygen (O_2) in the sample.

Propane in N_2.

Propane in 10% ± 0.5% O_2 and balance N_2.

Propane in zero grade air (refer to § 87.66(c)).

The volume concentration of propane in the mixture reaching the detector should be about 500 p.p.m.C., and the concentration of both the O_2 and hydrocarbon should be known within ±1 percent of the absolute value. The zero shall be checked after each mixture is measured. If the zero has changed then the test shall be repeated.

The response to propane in air shall not differ by more than 3 percent from the response to propane in the 10 percent-O_2/90 percent-N_2 mixture, nor differ by more than 5 percent from the response to propane in nitrogen.

The difference between the response to propane in nitrogen and response to propane in diluent containing 10 percent O_2 shall not exceed 2 percent. If the 2 percent specification cannot be met by changing the sample flow rate or burner parameters, such as air and/or fuel-flow rate, the detector shall be modified or replaced.

(iii) Linearity and relative response.

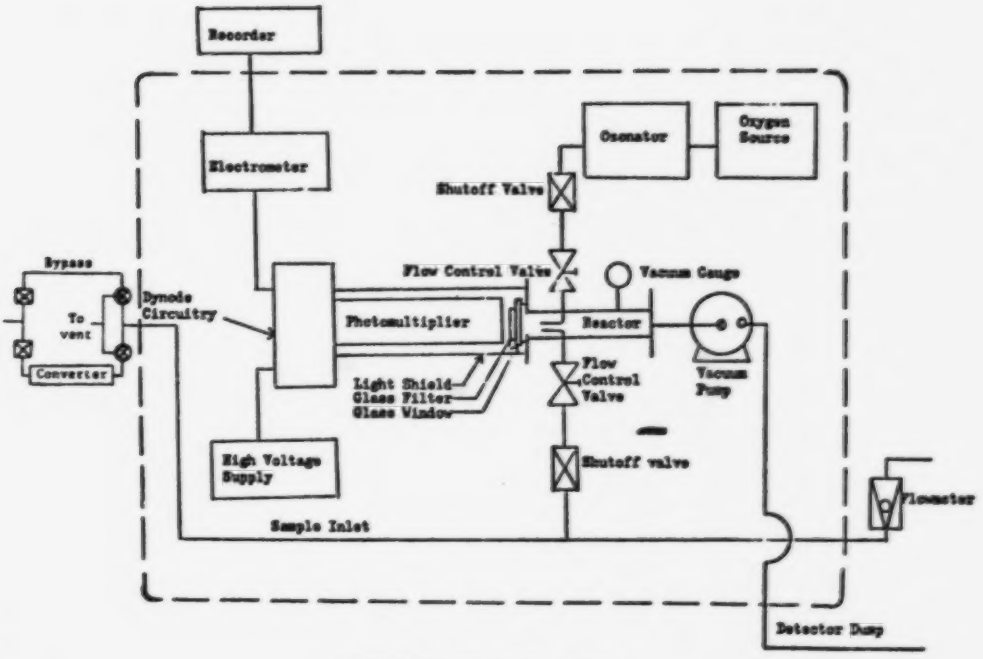
(*a*) With analyzer optimized in accordance with paragraph (b)(3)(i) of this appendix, the instrument linearity shall be checked for the ranges covering the range of analysis using propane in air at nominal concentrations of 30, 60, and 90 percent full scale of each range. The deviation of a best-fit curve from a least-squares best-fit straight line should not exceed 2 percent of the value at any point. If this specification is met, concentration values may be calculated by use of a single calibration factor. If the deviation exceeds 2 percent at any point, concentration values shall be read from a calibration curve prepared during this alignment procedure.

(*b*) A comparison of response to the different classes of compounds shall be made using (individually) propylene, toluene, n-hexane, and propane, each at 20 to 50 p.p.m.C concentration in air. If the response to propylene, toluene or n-hexane differs by more than 5 percent from the response to propane, check instrument operating parameters. Reducing sample flow rate improves uniformity of response.

(*c*) *Oxides of nitrogen analytical system.* The chemiluminescence method utilizes the principle that nitric oxide (NO) reacts with ozone (O_3) to give nitrogen dioxide (NO_2) and oxygen (O_2). Approximately 10 percent of the NO_2 is electronically excited. The transition of excited NO_2 to the ground state yields a light emission (600–2600 nanometer region) at low pressures. The detectable region of this emission depends on the PM-tube/optical filter being used in the detector. The intensity of this emission is proportional to the mass flow rate of NO into the reactor. The light emission can be measured utilizing a photomultiplier tube and associated electronics.

(1) The method also utilizes the principle that the thermal decomposition of NO_2 i.e. ($2NO_2 \rightarrow 2NO + O_2$), is complete at about 600°C. The rate constant for the dissociation of NO_2 at 600°C. is approximately 10^6 (liters/mole-second). A 6-foot length of one-eighth inch outside diameter, 0.028 inch wall thickness, flawless stainless steel tubing resistance heated using a low voltage, high current power supply to a temperature of 650°C. provides sufficient residence time at a sample flow rate of 700 cc. per minute (1.5 c.f.h.) for essentially complete conversion of nitrogen dioxide to nitric oxide. Other converter designs may be used if shown to yield equivalent results.

(2) The method permits continuous monitoring of NOx concentrations over a wide range. Response time (2 to 4 sec. is typical) is primarily dependent on the mechanical pumping rate at the operating pressure of the reactor. The following figure is a flow schematic illustrating one configuration of the major components required for the oxides of nitrogen analytical system.



OXIDES OF NITROGEN ANALYTICAL SYSTEM

(3) The oxides of nitrogen analyzer used in accordance with Subpart G of this part shall meet the following specifications:

Response time (electrical)—90 percent of full scale in 0.5 seconds or less.

Noise—Less than 1 percent of full scale.

Repeatability—±1 percent of full scale.

Zero drift—Less than ±1 percent of full scale in 2 hours.

Span drift—Less than ±1 percent of full scale in 2 hours.

Linearity—Linear to within ±2 percent of full scale on all ranges.

Accuracy—±1 percent of full scale on all scales.

(d) The dynamometer test stand and other instruments for measurement of power output and the fuel flow measurement instrumentation in accordance with Subpart G of this part shall be accurate to within ±2 percent at all power settings.

[38 FR 19090, July 17, 1973; 38 FR 34734, 34735, Dec. 18, 1973]

Appendix B—Instrumentation (Aircraft Piston Engine Measurements)

(a) The NDIR analyzers used for continuous monitoring of carbon monoxide and carbon dioxide in accordance with Subpart I of this part shall meet the following specifications:

(1) Response time (electrical)—90 percent full scale response in 0.5 second or less. Zero drift—Less than ±1 percent full scale in 2 hours on most sensitive range. Span drift—Less than ±1 percent of full scale in 2 hours on most sensitive range. Noise—Less than 1 percent of full scale on most sensitive range.

(2) Range and accuracy:

Range	Accuracy excluding interferences
Carbon monoxide, 0-12 percent.	±1 percent of full scale.
Carbon dioxide, 0-15 percent.	±1 percent of full scale.

(b) The FID analyzer used for measurement of hydrocarbons in accordance with Subpart I of this part shall meet the following specifications:

Response time (electrical)—90 percent of full scale in 0.5 second or less.

Noise—±1 percent of full scale on most sensitive range.

Repeatability—±1 percent of full scale.

Zero drift—Less than ±1 percent of full scale in 2 hours on all ranges.

Span drift—Less than plus or minus of full scale in 2 hours.

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Linearity—Response with propane in air shall be linear with ±2 percent over the range of 0 to 20,000 p.p.m.C.
Accuracy:

Range	Accuracy
0 to 100 p.p.m.C	±5 percent of full scale with propane calibration gas.
0 to 1,000 p.p.m.C	±2 percent of full scale with propane calibration gas.
0 to 10,000 p.p.m.C	±1 percent of full scale with propane calibration gas.

(c) The oxides of nitrogen analyzer used for measurement of oxides of nitrogen in accordance with Subpart I of this part shall meet the following specifications:

Response time (electrical)—90 percent of full scale in 0.5 second or less.
Noise—Less than 1 percent of full scale.
Repeatability—±1 percent of full scale.
Zero drift—Less than ±1 percent of full scale in 2 hours.
Span drift—Less than ±1 percent of full scale in 2 hours.
Linearity—Linear to within ±2 percent of full scale on all ranges.
Accuracy—±1 percent of full scale on all scales.

(d) The dynamometer, test stand, and other instruments for measurement of power output and air and fuel flow measurement instrumentation in accordance with Subpart I of this part shall be accurate to within ±2 percent at all power settings.

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Workers' Compensation Programs, Office of	20, I

Redesignation Table

Effective July 30, 1975 (40 FR 27590, June 30, 1975), the Environmental Protection Agency reorganized its existing motor vehicle emission regulations. The following table identifies those sections affected by that reorganization.

New Section	Prior Section
86.077-1	85.001
	85.101
	85.201
	85.301
	85.701
	85.801
	85.901
86.077-2	85.002
	85.102
	85.202
	85.302
	85.702
	85.802
	85.902
86.077-3	85.003
	85.103
	85.203
	85.303
	85.703
	85.803
	85.903
86.077-4	(1)
86.077-5	85.004
	85.104
	85.204
	85.304
	85.704
	85.804
	85.904
86.077-6	85.005
	85.105
	85.205
	85.305
	85.705
	85.805
	85.905
86.077-7	85.006
	85.106
	85.206
	85.306
	85.706
	85.806
	85.906
86.077-8	85.075-1
	85.076-1
	85.175-1
	85.176-1
86.077-9	85.275-1
	85.276-1
	85.376-1
	85.377-1
86.077-10	85.774-1
86.077-11	85.874-1
	85.974-1
86.077-12 through 86.077-20	(1)
86.077-21	85.075-2
	85.175-2
	85.275-2
	85.876-2
	85.774-2
	85.874-2
	85.974-2
86.077-22	85.075-3
	85.175-3
	85.275-3
	85.376-3
	85.774-3
	85.874-3
	85.974-3
86.077-23	85.075-4
	85.175-4
	85.275-4
	85.376-4
	85.774-4
	85.874-4
	85.974-4
86.077-24	85.075-5
	85.175-5
	85.275-5
	85.376-5
	85.774-5
	85.874-5
	85.974-5
86.077-25	85.075-6
	85.175-6
	85.275-6
	85.376-6
	85.774-6
	85.874-6
	85.974-6
86.077-26	85.075-7
	85.175-7
	85.275-7
	85.376-7
	85.774-7
	85.874-7
	85.974-7
86.077-27	85.075-8
	85.175-8
	85.275-8
	85.376-8
	85.774-8
	85.874-8
	85.974-8
86.077-28	85.075-28
	85.175-28
	85.275-28
	85.376-28
	85.774-28
	85.874-28
	85.974-28
86.077-29	85.075-29
	85.175-29
	85.275-29

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New Section	Prior Section
	85.376-29
	85.774-29
	85.874-29
	85.974-29
86.077-30	85.075-30
	85.175-30
	85.275-30
	85.376-30
	85.774-30
	85.874-30
	85.974-30
86.077-31	85.075-31
	85.175-31
	85.275-31
	85.376-31
	85.774-31
	85.874-31
	85.974-31
86.077-32	85.075-32
	85.175-32
	85.275-32
	85.376-32
	85.774-32
	85.874-32
	85.974-32
86.077-33	85.075-33
	85.175-33
	85.275-33
	85.376-33
	85.774-33
	85.874-33
	85.974-33
86.077-34	85.075-34
	85.175-34
	85.275-34
	85.376-34
	85.774-34
	85.874-34
	85.974-34
86.077-35	85.075-35
	85.175-35
	85.275-35
	85.376-35
	85.774-35
	85.874-35
	85.974-35
86.077-36	85.075-36
	85.175-36
	85.275-36
	85.376-36
86.077-37	85.075-37
	85.175-37
	85.275-37
	85.376-37
	85.774-37
	85.874-37
	85.974-37
86.077-38	85.075-38
	85.175-38
	85.275-38
	85.376-38
	85.774-38
	85.874-38
	85.974-38
86.077-39	85.075-39
	85.175-39
	85.275-39
	85.376-39
	85.774-39
	85.874-39
	85.974-39
86.078-8	85.078-1
86.177-1	85.001
	85.101
	85.201
	85.301
86.177-2	85.002
	85.102
	85.202
	85.302
86.177--3	85.003
	85.103
	85.203
	85.303
86.177-4	(*)
86.177-5	85.075-9
	85.076-9
	85.175-9
	85.275-9
	85.376-9
86.177-6	85.075-10
	85.175-10
	85.275-10
	85.376-10
86.177-7	85.075-11
	85.076-11
	85.275-11
	85.276-11
86.177-8	85.075-12
	85.076-12
	85.175-11
	85.275-12
	85.276-12
	85.376-11
86.177-9	85.075-13
	85.275-13
86.177-10	85.075-14
	85.175-12
	85.275-14
	85.376-12
86.177-11	85.075-15
	85.175-13
	85.275-15
	85.376-13
86.177-12	85.075-16
	85.175-14
	85.275-16
	85.376-14
86.177-13	85.075-17
	85.175-15
	85.275-17
	85.376-15
86.177-14	85.075-18
	85.175-16
	85.275-18
	85.376-16
86.177-15	85.075-19
	85.175-17
	85.275-19
	85.376-17
86.177-16	85.075-20
	85.175-18
	85.275-20
	85.376-18
86.177-17	85.075-21
	85.275-21
86.177-18	85.075-22
	85.175-19
	85.275-22
	85.376-19
86.177-19	85.075-23
	85.175-20
	85.275-23
	85.376-20
86.177-20	85.075-24
	85.175-21
	85.275-24
	85.376-21
86.177-21	85.075-25
	85.175-22

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Redesignation Table

New Section	Prior Section
	85.275-25
	85.376-22
86.177-22	85.075-26
	85.175-23
	85.275-26
	85.376-23
86.177-23	85.075-27
	85.275-27
86.777-1	85.701
86.777-2	85.702
86.777-3	85.703
86.777-4	(1)
86.777-5	85.774-9
86.777-6	85.774-10
86.777-7	85.774-11
86.777-8	85.774-12
86.777-9	85.774-13
86.777-10	85.774-14
86.777-11	85.774-15
86.777-12	Reserved
86.777-13	85.774-16
86.777-14	85.774-17
86.777-15	85.774-18
86.877-1	85.801
86.877-2	85.802
86.877-3	85.803
86.877-4	(1)
86.877-5	85.874-9
86.877-6	85.874-10
86.877-7	85.874-11
86.877-8	85.874-12
86.877-9	85.874-13
86.877-10	85.874-14
86.877-11	85.874-15
86.877-12	85.874-16
86.877-13	85.874-17
86.877-14	85.874-18
86.977-1	85.901
86.977-2	85.902
86.977-3	85.903
86.977-4	(1)
86.977-5	85.974-9
86.977-6	85.974-10
86.977-7	85.974-11
86.977-8	85.974-12
86.977-9	85.974-13
86.977-10	85.974-14
86.977-11	85.974-15
86.977-12	Reserved
86.977-13	85.974-16
86.977-14	85.974-17
86.977-15	85.974-18

[1]No corresponding prior section.
[2]Reserved.

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List of CFR Sections Affected

All changes in this volume of the Code of Federal Regulations which were made by documents published in the FEDERAL REGISTER since January 1, 1973, are enumerated in the following list. Entries indicate the nature of the changes effected. Page numbers refer to FEDERAL REGISTER pages. The user should consult the entries for chapters and parts as well as sections for revisions.

For the period before January 1, 1973, see the "List of Sections Affected, 1949-1963 and 1964-1972," published in three separate volumes.

1973

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Chapter I

85.075-38 (a)(3) added 14685
Revised 17133
85.075-39 Revised 17133
85.702 (a)(18) and (19) added 17164
85.774-2 (a) revised 17164
85.774-6 (a)(1) and (b) revised 17164
85.774-9 (b) revised; (d) added 17165
85.774-13 (b) revised 17165
85.774-28 (c)(1)(ii) revised 17165
85.774-30 (a)(2) and (b)(1)(ii) revised 17165
85.774-33 (a) revised 17165
85.802 (a)(23) and (24) added 17165
85.874-2 (a) revised 17165
85.874-6 (a)(1) and (b) revised 17165
85.874-7 (e) removed 17165
85.874-9 (d) revised 17165
85.874-15 (b) added 17165
85.874-28 (c)(1)(ii) revised 17165
85.874-30 (a)(2) and (b)(1)(ii) revised 17166
85.874-33 (a) revised 17166
85.902 (a)(23) and (24) added 17166
85.974-2 (a) revised 17166
85.974-6 (a)(1) and (b) revised 17166
85.974-7 (g) redesignated as 85.974-9 (g); new (g) and (h) added 17166
85.974-9 (d) added; (g) redesignated from 85.974-7(g) 17166
85.974-13 (a) revised 17166
85.974-16 (b)(6) revised 17166
85.974-18 (c) revised 17167
85.974-28 (c)(1)(ii) revised 17167

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85.974-30 (a)(2) and (b)(1) revised 17167
85.974-33 (a) revised 17167
85.1602 (a)(3)(ii) revised 17167
85 Appendix III revised 17167

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Chapter I

85.002 (a)(5) revised 21363
(a)(28), (29), and (30) added *7548
85.005 (a) (1) and (3) and (b)(1) revised; (a)(4) added *7549
85.006 (a) and (c) revised *7549
85.073-30 (a) (1) and (2) revised; (b)(3) amended; (c) added *7552
85.074-2 (b)(1) revised; (c) added *7551
85.074-3 Revised *7551
85.074-4 (c) revised 32258
85.074-12 (c) revised 30080
85.074-13 Introductory text amended; (b)(1) revised, (d) added *18076
85.074-14 (b) revised *18076
85.074-15 (j) revised *18076
85.074-15 (i) revised; incorrectly designated as (j) *18076
85.074-19 (d), (e), and (f) redesignated (e), (f), and (g); new (d) added 30080

NOTE: Asterisk (*) identifies changes published in 1974.

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85.074-20 Corrected....19683
85.074-20 (b) (1) and (2) revised....*18076
85.074-22 (f) revised....30080
85.074-22 (g) and (j) revised....*13076
85.074-23 (a)(3) and (6)(vii) revised....30080
(a)(6)(vii) corrected....31428
85.074-23 (a)(6) revised, Figure A74-8 added....*18076
85.074-26 (c) amended....30080
85.074-29 (b)(2) amended....*7552
85.074-30 (b)(1)(ii) revised....30080
85.074-30 (a) (1) and (2) revised; (b)(3) amended; (c) added....*7552
85.075-1 (a) revised....17441
85.075-2 (b)(1) revised; (c) added....*7550
85.075-3 Revised....*7550
85.075-4 (c) revised....32258
85.075-10 (a) and (b) revised....*2364
85.075-11 (a)(1) revised....30080
85.075-12 (c) revised....30080
85.075-13 Introductory text amended; (b)(1) revised; (d) added....*18077
85.075-14 (b) revised....*18077
85.075-15 (a) and (j) revised....*18078
85.075-19 (e) and (f) redesignated as (f) and (g)....30080
85.075-20 (a), (b) (1) and (2), (c), and Figure A75-2 revised....*18078
85.075-21 (b)(2)(iii) revised....*18079
85.075-22 (f) revised....30081
85.075-22 (g), (j), and (n) revised....*18079
85.075-23 (a)(2) and (6)(vii) revised....30081
85.075-23 (a) revised; Figure A75-8 added....*18079
85.075-24 (b) (14), (15), (16), and (17) revised....30081
85.075-26 (c) amended....30081
(c) revised....*18080
85.075-28 (c)(1)(i)(a) revised....30081
85.075-29 (b)(2) amended....*7550
85.075-30 (a) (1) and (2) revised; (b)(3) amended; (c) added....*7551
(b)(1)(iii) corrected....*18080
85.075-38 (b) and (b)(3) removed....30081
85.076-1 Revised....22474
85.101—85.176-1 (Subpart B) Revised....21348

Note: Asterisk (*) identifies changes published in 1974

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85.102 (a) (21), (22), and (23) added....*7553
85.105 (a) (1) and (3) and (b)(1) revised; (a)(4) added....*7553
85.106 (a) and (c) revised....*7553
85.175-2 (b)(1) revised; (c) added....*7555
85.175-3 Revised....*7555
85.175-4 (c) revised....32258
85.175-6 (a)(1)(i) revised....30081
85.175-12 (b) revised....*18080
85.175-13 (a) and (j) revised....*18080
85.175-18 (a), (b) (1) and (2), (c), (d), and Figures B175-2 and B175-3 revised....*18081
85.175-19 (f) revised....30081
85.175-19 (g), (j), and (m) revised....*18082
85.175-20 (a) revised; Figure B175-8 added....*18082
85.175-21 (b)(15) revised; (b)(16) removed; (b) (17)-(21) redesignated as (b) (16)-(20)....*18083
85.175-23 (c) revised....*18083
85.175-29 (b)(2) amended....*7555
85.175-30 (a) (1) and (2) revised; (b)(3) amended; (c) added....*7555
85.201—85.276-1 (Subpart C) Added....21363
85.202 (a) (26), and (27), and (28) added....*7556
85.205 (a) (1) and (3) and (b)(1) revised; (a)(4) added....*7556
85.206 (a) and (c) revised....*7556
85.275-2 (b)(1) revised; (c) added....*7558
85.275-3 Revised....*7558
85.275-4 (c) revised....32258
85.275-5 (b)(2) amended....*18084
85.275-10 (a) and (b) revised....*2364
85.275-11 (a)(1) revised....30081
85.275-12 (c) revised....30081
85.275-13 Introductory text amended; (b)(1) revised; (d) added....*18084
85.275-14 (b) revised....*18084
85.275-15 (d) table corrected....30439
85.275-15 (a) and (j) revised....*18084
85.275-19 (e) and (f) redesignated as (f) and (g)....30081
85.275-20 (a), (b) (1) and (2), (c) and Figure C75-2 revised....*18085
85.275-21 (b)(2)(iii) revised....*18086
85.275-22 (f) revised....30081

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85.275-22 (g), (j), and (n) revised *18086
85.275-23 (a)(2) and (6)(vii) revised 30082
(a)(6)(vii) corrected 31428
85.275-23 (a) revised; Figure C75-8 added *18086
85.275-24 (b) (14), (15), (16), and (17) revised 30082
85.275-26 (c) amended 30082, 31428
85.275-26 (c) revised *18087
85.275-28 (c)(1)(i)(*a*) revised 30082
85.275-29 (b)(2) amended *7558
85.275-30 (a) (1) and (2) revised; (b)(3) amended; (c) added *7558
(b)(1)(ii) amended *18087
85.275-38 (b) and (b)(3) removed 30082
85.702 (a) (20), (21), and (22) added *7559
85.705 (a) (1) and (3) (b) (1) revised; (a)(4) added *7559
85.706 (a) and (c) revised *7559
85.773-4 (c) revised 32258
85.773-30 (a) (1) and (2) revised; (b)(3) amended; (c) added *7561
85.774-2 (b)(1) revised; (c) added *7560
85.774-3 Revised *7560
85.774-4 (c) revised 32258
85.774-5 (c)(2) removed *18087
85.774-9 (b) revised 30082
85.774-29 (b)(2) amended *7561
85.774-30 (a) (1) and (2) revised; (b)(3) amended; (c) added *7561
85.775-10 (a) and (b) revised *2364
85.302 (a) (25), (26), and (27) added *7562
85.805 (a) (1) and (3) and (b) (1) revised (a)(4) added *7562
85.806 (a) and (c) revised *7562
85.873-4 (c) revised 32258
85.873-30 (a) (1) and (3) revised; (b)(3) amended; (c) added *7565
85.874-2 (b)(1) revised; (c) added *7564
85.874-3 Revised *7564
85.874-4 (c) revised 32258
85.874-5 (b)(2) and (c)(1) revised; (b)(3) added *18087
85.874-7 Heading amended; (e) added; (1) removed 30082
85.874-29 (b)(2) amended *7564

Note: Asterisk (*) identifies changes published in 1974.

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85.874-30 (b)(1)(ii) redesignated as (b)(1)(i) and revised 30082
(a) (1) and (2) revised; (b)(3) amended; (c) added *7564
(b)(1) (i) and (ii) revised *18088
85.902 (a)(23) revised 30082
85.902 (a) (25), (26), and (27) added *7565
85.905 (a) (1) and (3) and (b)(1) revised; (a)(4) added *7566
85.906 (a) and (c) revised *7566
85.974-2 (b)(1) revised; (c) added *7567
85.974-3 Revised *7567
85.974-4 (c) revised 32258
85.974-16 (b)(6) [revised] redesignated as (c)(6) 30082
85.974-18 (c) revised 30082
(c) corrected 32138
85.974-28 (c)(1)(i) (*a*) and (*b*) revised 30082
85.974-29 (b)(2) amended *7567
85.974-30 (b)(1) (i), and (ii), and (iii) revised 30082
(a) (1) and (2) revised; (b)(3) amended; (c) added *7567
(b)(1)(i) and (ii) revised *18088
85 Appendix III amended 30083
Appendix V and Schematic removed *18088
87 Added 19090
87.11 (a) revised *4884
87.64 (c)(1)(2)(c) revised 34734
87.66 (a)(6) (i) and (vi) revised 34734
87.70 (a) (2) and (3), (b)(4), and (d) table corrected; (e)(4)(iii) revised 34734
87.93 (d) corrected 34734
87.96 (a) corrected 34734
87.99 (e)(2)(ii) and (5)(i) revised 34734
87.101-87.102 (Subpart J) Added 35001
87 Appendix A corrected 34734, 34735

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85.001—85.076-1 (Subpart A) Heading revised; eff. 7-30-75.....†27593
85.001 Revised; eff. 7-30-75.....†27593
85.002 (a)(31) and (32) added.....37301
85.003 Amended.....37301
85.075-2 (a) revised.....†5524
85.075-5 (a) amended.....†5524
85.075-7 (d)(2) revised.....†21730
85.075-15 (e)(2) revised.....†21730
85.075-28 (a) revised.....†5524
85.075-30 (a)(3) added; (b)(2) revised.....†5524
85.075-35 (a)(4)(v) revised.....†5524
85.076-1 Revised.....†24350
85.076-5 (f) revised.....25321
Revised.....†24186
85.076-7 (a) and (b) revised.....25321
Revised.....†24187
85.076-9 Revised.....25321
Revised.....†24188
85.076-11 Revised.....25321
Revised.....†24188
85.076-12 Revised.....25322
(b)(1) revised.....†21731
Revised.....†24188
85.076-30 Added; eff. 9-29-75....†27450
85.076-35 Added; eff. 9-29-75....†27451
85.077-1 Added.....†24350
Removed.....†27593
85.077-4 (b) revised.....37301
Removed.....†27593
85.077-5 (b)(5) and (6) revised....37302
Removed.....†27593
85.077-6 (b) revised.....37302
Removed.....†27593
85.077-7 (a) revised.....37302
Removed.....†27593
85.077-10 (a) revised.....37302
Removed.....†27593
85.077-30 (a)(1), (3), (4), and (5) and (b)(1), (i), (ii), and (iv) revised.....37302
(a)(3), (4), (5), and (6) correctly designated; (a)(3) correctly reinstated.....†5524
Removed.....†27593
85.077-35 (a)(4)(iv) and (vi) revised.....37303

Note: Symbol (†) refers to 1975 page numbers.

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85.077-38 (a)(3) and (4) revised.....37303
(a)(3), (4), and (5) correctly designated; (a)(3) correctly reinstated.....†5525
Removed.....†27593
85.078-1 Added.....†24350
Removed.....†27593
85.101—85.176-1 (Subpart B) Heading revised; eff. 7-30-75.....†27593
85.101 Revised; eff. 7-30-75.....†27593
85.102 (a)(24) and (25) revised...37303
85.103 Amended.....37303
85.175-2 (a) revised.....†5524
85.175-7 (d)(2) revised.....†21730
85.175-13 (e)(2) revised.....†21731
85.175-28 (a) revised.....†5524
85.175-30 (a)(3) added; (b)(2) revised.....†5524
85.175-35 (a)(4)(v) revised.....†5524
85.176-1 Revised.....†24350
85.177-1 Added.....†24351
Removed.....†27593
85.177-4 (b) revised.....37303
Removed.....†27593
85.177-5 (b)(5) and (6) revised...†37303
Removed.....†27593
85.177-6 (b) revised.....37303
Removed.....†27593
85.177-7 (a) revised.....37303
Removed.....†27593
85.177-30 (a)(1), (3), (4), and (5) and (b)(1)(i), (ii), and (iv) revised.....37303
(a)(3), (4), (5), and (6) correctly designated; (a)(3) correctly reinstated.....†5525
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85.301—85.377-1 (Subpart D) Added..... 37611
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85.377-6 (b) added..... †18779
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85.377-7 (a) added..... †18779
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85.701—85.775-10 (Subpart H) Revised..... †8483
85.774-11 (a)(3) corrected..... †16667
85.801—85.874-39 (Subpart I) Revised; eff. 7-30-75..... †27576
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85.076-35 (a)(4)(v) and (c) revised..... 58647
85.275-10 (b) revised..... 33973
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(a)(4) revised; (a)(5) and (a)(6) revised and merged as new (a)(5); new (a)(6) added Δ9879
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86.077-1 Revised 29389
86.077-2 Amended 29390
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86.077-5 (a)(2) introductory text revised 29390
86.077-7 (c)(7)(iv) amended 31483
86.077-9 (a)(1) revised 29390
86.077-23 Revised *16398
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86.077-26 (a)(3) introductory text, (3)(i)(C) and (ii)(C), (a)(4) introductory text, (6)(ii), and (7), (b) (3), (4), and (7), and (c)(3) (i) and (ii) and (5)(iii) revised *16399
86.077-27 Revised 29392
86.077-28 (a)(2) revised *16399
86.077-30 (a)(2) amended; (d) added 31482
(c)(1)(ii) revised 31483
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86.078-2 Added 35628
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86.078-3 Added 35629
86.078 Added 35629
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86.078-9 Added 35629
86.078-21 Added 35629
86.078-22 Added 35629
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86.078-23 Added 35629
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86.078-24 Added 35629
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86.078-25 Added 35630
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(b)(1)(iv) and (f) revised; eff. 7-5-77 ..... *28131
86.078-26 Added 35630
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86.078-28 Added 35630
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(a)(4)(iv) revised; eff. 7-5-77 ..... *28131
86.078-29 Added 35631
86.078-30 Added 35631
(a)(3), (b)(1)(i)(D), (2) and (4) revised; (b)(5) and (6) added *16408
86.078-35 Added 35632
86.078-37 Added 38681
86.079-1 Added 56318
86.079-2 Added 56318
86.079-9 Added 56318
86.079-20 Added 56318
86.079-21 Added 56318
86.079-26 Added 56318
86.079-30 Added 56318
86.079-35 Added 56318
86.101—86.177-23 (Subpart B) Revised *32954
86.101 Redesignated from 86.101-78; (a)(1) and (2) amended *16409
86.101-78—86.145-78 (Subpart B) Added 35632

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86.101-78 Redesignated as 86.101 and (a)(1) and (2) amended *16409
86.102 Redesignated from 86.102-78 ..... *16409
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86.103 Redesignated from 86.103-78 ..... *16409
86.103-78 Redesignated as 86.103 ..... *16409
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86.107-78 (a)(2)(i) and (ii) revised; (a)(3) and (5) amended *16409
86.113-78 (b)(2) and (3) amended 38682
86.114-78 (a)(7) added (a)(4) revised *16409
86.116-78 (c)(1) amended *16409
86.117-78 (b)(2) revised *16409
86.119-78 (b)(1), (7)(iii) and (v), and (c)(6) amended *16409
86.121-78 (b)(3) revised 38682
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86.128-78 Revised *16409
86.129-79 Added 56319
86.133-78 (m) amended *16409
86.135-78 (h) added 38684
86.135-79 Added 56319
86.136-78 (c) revised 38684
(a) and (b) revised *16409
86.137-78 (b)(1), (11), (13), (16), and (17) amended; (b)(7) revised 38684
(b)(12) amended *16410
86.142-78 (f) revised; (p) added 38684
86.142-79 Added 56319
86.143-78 Amended *16410
86.144-78 (a) and (d)(4) revised; (d)(1), (2), and (3) amended 38684
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86.177-1—86.177-4 Removed 35651
86.177-4 Added *16410
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86.501-78—86.544-78 (Subpart F) Added *1137
86.601—86.613 (Subpart G) Added 31483
86.602 (a)(13) through (16) added *31160
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86.777-11 (b)(2) revised 29393
86.777-13 (b)(6) and (c) revised 29393
86.877-7 (a)(2)(iii) and (4) revised 29393
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87.21 (d) amended; (e) revised 34725
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87.65 (d) revised 39746
87.67 (a)(5) revised 39746
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87.93 (a) Figure 7 and (c)(2) revised 39747
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85.201–85.276-35 (Subpart C) Removed 36457
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85 Appendixes I through IV removed 36457
86.077-2 (a) revised 45135
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86.079-2 Amended 45135
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86.079-11 Added 45136
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86.079-39 Added 45151
86.080-2 Added 45646
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86.080-11 Added 45152
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86.080-26 Added 45649
86.108-78 Revised 45651
86.108-79 Added 45651
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86.114-78 (a)(7) revised 45652
86.121-78 (b)(3) revised 45652
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86.129-79 (a) table and (b) revised; (c) added 45652
86.129-80 Added 45653
86.135-78 (h) revised 45654
86.136-78 (c) revised 45654
86.137-78 (b) (1), (11), (13), (16) and (17) amended; (b)(7) revised 45655
86.142-78 (f) and (p) revised 45655
86.142-80 Added 45655
86.144-78 (d) (1), (2) and (3) amended; introductory text, (a) and (d)(4) revised 45655
86.301-79–86.347-79 (Subpart D) Added 45154
86.402-78 Amended 56737
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86.416-78 (a)(2)(ii) revised 56737
86.416-80 Added 56737
86.426-78 (a) revised; (c) added 56737
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85 Suspended in part..... 47729
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86 Authority citation revised..... 52928
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85 Heading revised *34806
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85.1702 (a)(5) amended *13733
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